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# Paper Mill Employment Gains in Wisconsin

## For Every Thousand Workers Hired, Four More Were Hired in June Than in May — Paper Manufacturers Indicate They Desire "Port Equalization" Principle Eliminated — F. J. Sensenbrenner on Flowage Control.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., August 2, 1937—Both employment and payrolls increased in the pulp and paper industry in Wisconsin during June, according to figures issued by the United States Department of Labor. For every thousand workers hired, four more were hired in June than in May, and 128 more than in June, 1936. For every thousand dollars paid them, workers received $26 more than in May, and $293 more than in June, 1936.

Independent labor unions which have been organized among hourly workers in several Wisconsin paper mills are not faring so well in their applications for recognition as the bargaining agency of the employees by the newly created state labor relations board. Applications of the Nekoosa-Edwards Paper Company union, Neekosa, Wis., and the Appleton Coated Paper Company, Appleton, Wis., have been denied for registry by the board.

The Nekoosa-Edwards application was the first one on which the board was called to act, holding that it is not a legitimate labor organization. The board said it was not convinced in the evidence taken at a hearing at Wisconsin Rapids, Wis., July 17 that the independent group is not a company union. No formal opinion accompanied the announcement. The board merely said it had considered all the evidence taken and had declined to recognize the union. The recognition was opposed by an American Federation of Labor group which claimed the right to represent the Nekoosa-Edwards employees.

Application for recognition of the Appleton Coated Paper Company independent union was considered at a hearing at Appleton July 17, and the board last week denied the listing. "Under the Wisconsin labor law," the board said, "a labor union must file a statement giving the names of its officers and affiliations and persuade the board that it is not a company union before it is officially listed by the board." The association did not qualify under the law, the board said.

### Demand Lower Coal Rates

Arguments supporting a demand for lower coal freight rates were presented at a hearing before the Wisconsin Public Service Commission at Madison, Wis. last week by Earl Bryan of Chicago, representing the Wisconsin Paper and Pulp Manufacturers' Traffic Association. The railroads are opposed to the revision, and were overruled by the commission in their desire to suspend the hearing in favor of the present status.

Mr. Bryan indicated that the paper manufacturers desire the "port equalization" principle eliminated. It constitutes an arrangement by which the rates are the same from several Great Lakes ports for coal hauled a specified distance. Reductions are also, sought, he said, so the paper industry may meet competition more adequately. Figures were cited to show that paper and pulp mills of the Fox River Valley purchased 288,353 tons of coal annually, the Wisconsin River Valley 218,243 tons, and the northern district mills, 158,267, or a total for the state of 664,863 tons. About 40,000 tons are shipped direct by rail, and the remainder by both water and rail.

### F. J. Sensenbrenner Named

F. J. Sensenbrenner, president of the Kimberly-Clark Corporation, Neenah, Wis., has been named on a committee of ten by the newly organized Fox and Wolf River Conservation Association to assist in preparing resolutions and presenting them to the War Department in Washington on behalf of a reservoir system for flowage control. Philip Vogt, of the Interlake Pulp and Paper Company, Appleton, Wis., also is on the committee.

This procedure was worked out at a meeting at Kaukauna, Wis. last week of fifty persons representing cities of the Fox River Valley. They are mapping united action at Washington September 1 when a hearing will be held by federal engineers to determine whether a survey should be taken to outline a program of water control. Further work on the survey was stopped last May by the engineers, who believed the benefits derived were too few in comparison with the cost. The association contends the government considered the project only from the standpoint of flood control, but that it involves also the control of flowage in the dry season, control of health conditions, and conservation.

Efforts will be centered on what is known as the

*(Continued on page 65)*

# Basin Mills Paper Co. Leases Orono Paper Mill

## Will Begin Operations About Oct. 1, Making About Fifty Tons of Unbleached Sulphite Daily — Oxford Paper Co. Starts Former Continental Mill at Rumford and Will Manufacture about Sixty Tons of Pulp Daily.

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., August 1, 1937—The plant of Orono Pulp and Paper Company at Basin Mills in Orono, Me., has been leased by the recently incorporated Basin Mills Paper Company, it was announced by Charles G. Paine, general manager of the Eastern Manufacturing Company, by which the Orono company was formerly operated.

The new company will manufacture unbleached sulphite, and the mill will have a capacity of between 40 and 50 tons a day.

Richard H. Smith of Pelham, N. Y., is to be president and general manager. Operations will probably begin October 1. The plant has been closed since 1934.

### Oxford Paper Co. Starts New Mill

Oxford Paper Company of Rumford, Me. has started operation of the mill formerly owned by Continental Bag and Paper Company in that city. About 60 tons of sulphite pulp a day are being turned out for Oxford Company's own use. The properties of Continental Bag and Paper Corporation were purchased several months ago by Oxford which in turn modernized the mill at a cost of $250,000. Company is employing several hundred workers.

### Introduces New Green Book

John C. Hurd, executive secretary of the New England Paper Merchants Association, is making the rounds of the wrapping paper members of the association to introduce and familiarize them with the new Green Book containing ready reference tables for wrapping and paper products, just compiled and issued by the Statistical Research Division of the National Paper Trade Association of the United States.

### Discuss Market Tendencies

Market tendencies and routine matters were discussed at a recent meeting of the Cost Finding Committee. John C. Hurd, executive secretary of the New England Paper Merchants Association, presided in the absence of Harry J. Dowd, chairman.

### Donald A. Bartlett Returns

Donald A. Bartlett, a director of Stimpson & Co., Inc., has returned with his family from a vacation at Bow Lake, Stafford, N. H.

### F. W. Tully Goes on Vacation

Frank W. Tully, head of the white paper department of Stimpson & Co., Inc., has gone on a vacation to Squam Lake, accompanied by his family.

### Smith, Dee & Lane Handle Dustex

Smith, Dee & Lane, general paper mill representatives, are successfully handling Dustex, a new product of Harvey Paper Products, Sturgis, Mich. This dusting paper is described as differing greatly from any other on the market, due to the fact that it is treated with a harmless solution, that could be taken internally without ill effects and is safe for children to handle. Dustex is impregnated with the highest grade materials, producing a polishing and dusting agent of unsurpassed effectiveness. It is economical, sanitary and convenient. This product will not scratch or injure the finest surfaces and is a preservative, resisting rust, tarnish and stain, and picking up and holding dirt. It is not injurious to the hands or clothing.

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## Simplified Practice for Boxes

The Standing Committee in charge of Simplified Practice Recommendation R146-33, Corrugated and Solid Fiber Boxes for Canned Fruits and Vegetables, has approved a revision of the recommendation, and the Division of Simplified Practice of the National Bureau of Standards has mailed copies to all interests for consideration and approval.

The original recommendation, which was approved at a general conference of manufacturers, distributors and users of fiber board shipping boxes for canned fruits and vegetables, and made effective January 1, 1933, established a list of 41 sizes of boxes, based on the arrangement and number of cans per box, for the 27 cans which were standard at that time.

The proposed revision reduces the 41 sizes of boxes to 26, and these are based on unit of pack and arrangement of cans in box, for the 21 sizes of cans currently standard in the canning industry, and shown in Simplified Practice Recommendation R155-37, Cans for Fruits and Vegetables (names and dimensions).

Mimeographed copies of the proposed revision of the simplified practice recommendation for boxes may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

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## Now Brill Equipment Corp.

The Stein-Brill Corporation of 183 Varick street, New York City announces a change in the corporate name to the Brill Equipment Corporation. There will be no change in management. The company announces the opening of a St. Louis office and warehouse located in the Mart Building at St. Louis, Mo.

The company is now in a position to serve its eastern and middle western clients to better advantage and it will be able to furnish equipment from both warehouses.

Both offices will specialize in machinery and equipment for the following industries: Chemical, Pharmaceutical, Food Product, Wine and Liquor, Paint, Soap, Rock Product, Plastics, Oil Refining, Rubber, Paper Mill, etc.

The St. Louis branch is also representing several nationally known machinery manufacturers in the St. Louis territory and will have display rooms in the Mart Building for this purpose.

HOW DO YOUR SCREENS STACK UP AGAINST *This one*

- for capacity
- for cleaning efficiency
- for accessibility
- for screening cost per ton

BIRD MACHINE CO.
SOUTH WALPOLE
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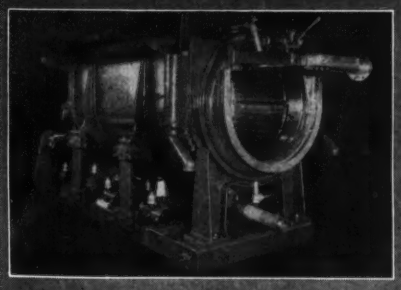

If the experience of dozens of mills making all grades is anything to go by you may find you can no longer afford to operate without the newest model Bird Screens. . . . May we give you the story?

**BIRD SCREENS**

YOU CAN MAKE MORE MONEY WITH NEW BIRD MACHINERY

# Newsprint Shows Big Expansion in Ontario

## Exceeds 1,000,000 Tons This Year for First Time in History—To Spend $44,000,000 On New Pulp and Newsprint Mills — Head Office of Lake Pulp Co. To Be Moved To Nipigon—New Sales Manager For Alliance.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., August 1, 1937—Speaking at Sault Ste. Marie, Ont., last week, Hon. Peter Heenan, Ontario Minister of Lands and Forests, reviewed the pulp and newsprint developments in sight for Northern Ontario. The Sault area, he said, would have two new mills, a pulp sulphite mill to be erected between the Sault and Spragg at a cost of $4,000,000 and a pulp mill at Michipicoten to cost $5,000,000. Agreement for the Michipicoten has not yet been signed. In addition the Sault mill of the Abitibi Power and Paper Company is to be enlarged.

Newsprint production of Ontario would exceed 1,000,000 tons this year for the first time in history, he declared. The pulpwood cut would be in excess of 1,000,000 cords in the coming cutting season and he predicted revenue from forests of Ontario would reach $4,000,000, compared with $1,927,000 when he assumed the portfolio in 1933. Forty-four millions would be spent in new pulp and newsprint mills. Cutting pulpwood for export to the United States had been banned in four areas, Mr. Heenan said, as the result of the movement of capital to Ontario to establish pulp and newsprint mills.

### E. G. Rolph Is New Sales Manager

It was announced at the head office of the company in Toronto last week that E. G. Rolph, late of Montreal, had been appointed sales manager of Alliance Paper Mills, Ltd., in succession to the late Charles Taylor. Born and brought up in Toronto, Mr. Rolph is a graduate of the School of Science, Toronto University, and has been with the Howard Smith Company at Montreal for the past twelve years, lately as sales promotion manager. Mr. Rolph served some time at the Cornwall plant of the company and is well-equipped for the responsibilities of his new position. Neill Powter, of Montreal, has taken Mr. Rolph's place as advertising manager with headquarters at Montreal.

### Move Head Office to Nipigon

Following the appointment of a new board of directors, the majority of whom are residents in Ontario, the head office of the Lake Sulphite Pulp Company, Ltd., is to be moved to Nipigon, Ont., according to an announcement last week. It was further announced that the company had purchased all of the common shares of the Nipigon Corporation, formerly owned and operated by the Canadian International Paper Company. The company owns and operates a ground wood pulp mill with a capacity of 50 tons daily, located at Nipigon, eight miles from the Lake Sulphite plant on which construction work is well advanced. The timber limits of the Nipigon Corporation comprise some 1,400 square miles fronting on the eastern shore of Lake Nipigon, adjoining the limits of the Lake Sulphite Company. The operations of the Nipigon Corporation will be continued on the present basis. At a later date, in accordance with the agreement entered into with the Ontario Government, a new mill will be constructed for the manufacture of either pulp or paper.

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## Beach & Arthur Kleen Products Buy Mill

COATESVILLE, Pa., July 30, 1937—It was revealed last week that the purchaser of the paper mill at Modena, Pa., whose sale was announced some months ago by the Paterson Parchment Paper Company, is the Beach and Arthur Kleen Products Company.

It was revealed that the Mahony Troast Construction Company, of Passaic, N. J., has been given the contract for the erection of a large addition to the present plant, plans for which have been prepared by F. L. Smith, of New York, the company's construction engineer.

The new additions to the plant will include a new brick building, 200 by 80 feet, to be erected on the south side of the present plant, and a number of smaller buildings, which will greatly increase the facilities of the plant, both as to capacity and to diversity of products. Just what the company will manufacture has not yet been announced but it is said that it will be a variety of products made of paper.

It is said that around 500 men will be employed when the new plant is running full time, but it will be several months yet before production can begin. December 1 was set some time ago as a possible date for beginning operations, but this will depend entirely on the progress that is made in the construction work which is about to begin.

The new buildings now under contract will be rushed to completion as soon as possible and the machinery installed. Meantime, the changes and rearrangements that are now being made in the rest of the plant will go right ahead. It is said that when all the improvements contemplated have been completed the Modena plant will be one of the most modern and up-to-date paper plants in the country.

As a result of the activities at the mill and the prospects for plenty of work Modena is looking forward to a big boom in the near future. Since the Paterson Company closed down the plant and moved away business has been quiet in the borough but its residents have been able to find work in Coatesville and elsewhere and the situation has not been nearly as bad as it might have been. At the present time a large force of men is employed in making changes to the plant.

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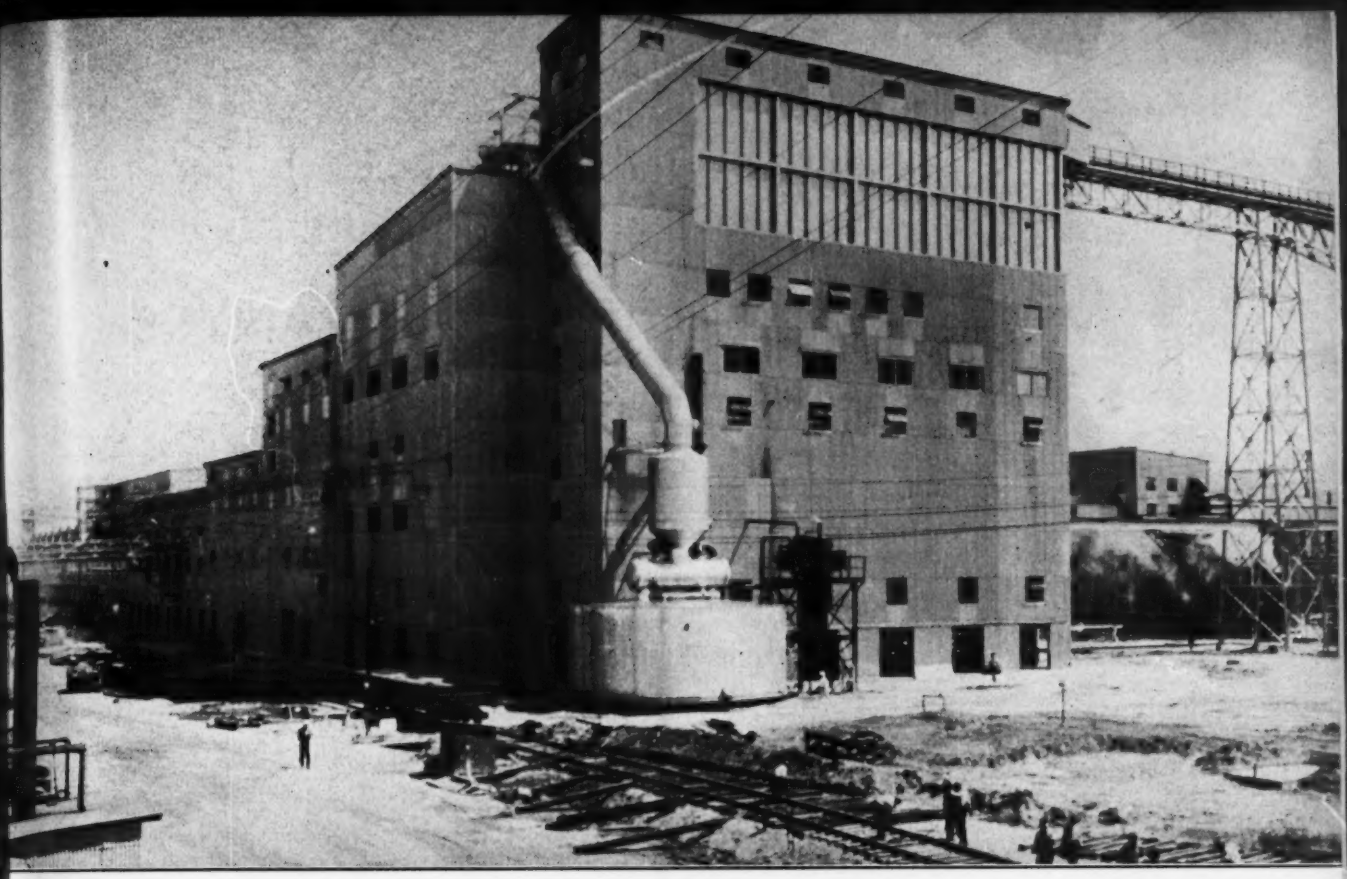
## Harrison Starr Goes with Price & Pierce

Harrison Starr, formerly connected with Brown Company of Portland, Maine, and then with Attebury Brothers, Inc., is now the Middle West representative for Price & Pierce, Limited, 60 East 42nd street, New York City. Mr. Starr's headquarters will be at Kalamazoo, Mich.



# West Virginia Pulp & Paper Co.

## New Mill

## at

## CHARLESTON, S. C.

# MORTON C. TUTTLE COMPANY

**BOSTON — MASSACHUSETTS**

# BUILDERS

OF

THIS NEW MILL

AT

CHARLESTON, SOUTH CAROLINA

FOR

WEST VIRGINIA PULP AND PAPER COMPANY

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THE MORTON C. TUTTLE COMPANY HAS BUILT FOR

| | |
|---|---|
| WEST VA. PULP AND PAPER COMPANY | Mechanicville, N. Y. |
| WEST VA. PULP AND PAPER COMPANY | Covington, Va. |
| WEST VA. PULP AND PAPER COMPANY | Luke, Md. |
| WEST VA. PULP AND PAPER COMPANY | Williamsburg, Pa. |
| BROWN PAPER MILL COMPANY | Monroe, La. |
| MAINE SEABOARD PAPER COMPANY | Bucksport, Me. |
| TILESTON AND HOLLINGSWORTH CO. | Hyde Park, Mass. |
| SOUTHERN PAPER COMPANY | Moss Point, Miss. |
| PENOBSCOT CHEMICAL FIBRE CO. | Great Works, Me. |
| OXFORD PAPER COMPANY | Rumford, Me. |
| JESSUP AND MOORE PAPER CO. | Wilmington, Del. |
| CHAMPION PAPER AND FIBRE COMPANY | Canton, N. C. |
| CHAMPION PAPER AND FIBRE COMPANY | Pasadena, Texas |

# West Virginia Pulp & Paper Co.'s Expansion Has Far Reaching Effects

## Big Business Cooperates in Development of South

**By Reginald Trautschold, Engineering Consultant**

The new kraft mill of the West Virginia Pulp and Paper Company, some ten miles north of Charleston, S. C., and about twenty-seven miles from the Edisto River, the chief source of the mill's essential water supply, makes history for the South. A giant industry has sprung up in a few short months—forty-six weeks from driving the first foundation pile to the day of the first cook—and makes profitable use of great areas of timber lands, heretofore only a potential source of revenue, a questionable asset awaiting systematic and guided development.

The mill, costing in the neighborhood of $6,000,000, adds much, naturally, to the industrial wealth of the state, but it does far more. It has made possible an adequate and much needed water supply for the city of Charleston and its environs—adequate for many years to come. Also, by interconnection with the local public utility lines, for an exchange of power which consists of feeding mill power almost continuously to the utility lines, cheap, dependable and efficient electric service is assured to the inhabitants of South Carolina.

These are not simply chance developments, but a carefully planned scheme of expansion by which the paper interests and the community which affords the opportunities for the business growth cooperate, pool their resources, to their decided mutual advantage. In short, big business at its best—not grasping nor paternal, but fraternal, assuming its civic responsibilities by giving as well as taking.

### Water and Wood

The water supply situation is, in brief, that forty years ago Charleston seriously contemplated augmenting its even then inadequate water supply from the Edisto River, but at that time the estimated cost of the project, about $5,000,000, was more than the city could assume. During the war, the city, to obtain additional water for the Government, secured an auxiliary supply from the Ashley River, by constructing a low type dam, pumping station, pipe line and open canal leading to the Goose Creek Reservoir, which then had recently been taken over by the city. This supply was found quite inadequate in the drought years of 1926-1927, so during 1928 the city started construction on an unlined tunnel, below sea level, through marl formation, from the Edisto to the cypress swamp in which the Ashley River has its source, and this tunnel was placed in service in 1931, at a cost of $500,000, this unique arrangement having been conceived and engineered by James E. Gibson, manager and engineer of the Water Department.

It is in the completion of this tunnel, its extension through eighteen more miles of marl formation to the Hanahan Pumping Station of the Goose Creek Reservoir, that the West Virginia Pulp and Paper Company enters the picture. By contracting with the city, after a thorough investigation by leading experts into the suitability and durability of the tunnel construction at the intake end built in 1928 and as proposed for the tunnel continuation to Goose Creek Reservoir, to purchase its water supply at a minimum rate of $30,000 a year, the city was enabled to float water bonds to finance the construction of the additional miles of tunnel. That is, the West Virginia Pulp and Paper Company's contract guarantees the interest on the bonds, relieving the city of all carrying charges on the needed water supply project which has baffled the resources of that city since the question was first broached, as far back as 1853.

For fifteen years, also, the paper company has been purchasing wood, helping materially in the support of the state, and with an abundant supply of pulp logs assured for the future and plenty of good water, in exchange for making possible the financing of Charleston's present and future water supply needs, the Charleston plant of the West Virginia Pulp and Paper Company started operation about July 1 of this year with an initial output of some 300 tons daily and an ultimate output, with the one 242-inch Fourdrinier kraft liner machine now in place, of 400 or possibly 500 tons per day.

### A Paper Man's Mill

The plant is essentially a practical paper maker's mill, planned, designed and the equipment throughout selected by the experienced engineering department of the paper company, with the actual construction carried out by a contractor specializing in work of this nature and with numerous successful paper mills to his credit. For months prior to the actual commencement of building operations, the engineers of these two organizations, the paper mill experts and the experienced specialists of the general contractor, worked together, predetermining costs of building the plant on several possible sites and, after the general plans for the mill were settled, in scheduling the work step by step, timing deliveries on materials to avoid congestions, delays and confusion. Foundations were built in the proper order and made ready for the steel as it arrived on the job. Completion of subcontracts on prescribed dates were rigorously enforced, job budgets closely followed and reported upon weekly and expenses constantly compared with standard costs for similar work. At no time were costs on the mill allowed to get out of line, for every agency connected with the undertaking was kept continually posted upon the exact status of the work, both as to progress and to cost.

### Building Constructions

The several buildings making up the plant occupy

an area of about twenty-three acres, the preparation of which was an undertaking of some magnitude. Considerable back filling, especially at the machine room site, was involved and close to 18,000 wooden piles had to be driven to support building walls and foundations for heavy machinery and equipment.

Approximately 6,000 tons of structural steel went into the skeleton frames of the various buildings, the walls of the 92 x 67 foot power house 52 feet high and the slightly taller 538 x 120 foot machine room being constructed of glazed, low grade fire-brick, hollow tiles encasing the concrete protected girders and columns. Protected metal roofing and siding cover the digester building, pan room, jordan room, chip house and machine shop, approximately 450,000 square feet of the metal being so used.

The tile construction adopted for the power house and machine room is noteworthy in several respects, for it unquestionably was instrumental in attaining the speed with which the buildings were erected. The tiles, timed to a nicety in respect to arrival on the job, are relatively large, measuring 5 x 12 x 8 inches, salt glazed units which, in addition to being light in weight, have smooth built-in handles by which they are easily picked up in laying a wall, greatly speeding-up and lowering the cost of wall building, as compared with the erection of an ordinary 8-inch brick wall. In place, the mortar keys into exterior and interior double shell openings and there is an absence of continuous mortar joints throughout the wall, the result being that the erected tile wall weighs only about half as much as a brick wall of like thickness—six brick being required as against a single stretcher tile.

Both interior and exterior built-up surfaces are finished and the hollow construction gives the tile walls high insulation value. Despite their lightness, however, the glazed tile possesses adequate strength for all load bearing requirements, is resistive to fire, distinctly rigid and effects marked savings in painting and maintenance expenses. The tile walls lend themselves well to the functional, diffused daylight building construction used in both power house and machine room at Charleston, secured by the insert of glass brick panels. In the power house there are twenty-three of these panel openings, containing 2,788 glass brick—7¾ x 7¾ x 3¾ inches in size. In the machine room, about a hundred and fifty of similar glass brick openings admit abundant glareless daylight to every corner of the immense building.

TRIMMING PILES FOR MACHINE ROOM FOUNDATION. BACK FILLING ALSO NECESSARY.

One of the features of the protected metal buildings which, incidentally, have proved in other plants of the West Virginia Pulp and Paper Company to be exceedingly durable, resistive to corrosion and low in upkeep expenses, is the provision made for ventilation to remove excess moisture and provide a calculated number of air changes in departments where fumes are customarily troublesome. In this connection, efficient ventilators, varying in size from 18 inches to 48 inches in stack diameter, with hoods and ducts, are installed on the water treatment plant, power plant and screen room. A protected metal fire wall is also provided between the machine and jordan rooms.

In the digester house, a small, 5 x 5 foot platform, geared service elevator of 2,000 pounds capacity travels a distance of slightly less than 100 feet through five floors, operated by double button control. An electric, sidewalk type, elevator travelling a distance of 22 feet, from the basement to the second floor, is also installed, likewise operated by double button control and designed for a 1,500 pound load. The platform of this latter lift measures 4 x 6 feet and is equipped with a safety device.

CLOSE UP OF A DOZEN OF THE 18,000 DRIVEN PILES

### The Water Supply

The all important water supply, so far as the West Virginia Pulp and Paper Company is concerned, is taken from the Goose Creek Reservoir, where a distinctive cylindrical pumping station houses at present three powerful pumps with an aggregate capacity of 38,600 gallons per minute and provides space for a fourth unit—when and as required. These pumps are set 10 feet or so below the normal level of the reservoir, to insure a steady, even flow, and discharge to a 48-inch concrete pipe line extending some 12,750 feet to a combination reservoir and settling basin of 10,000,000 gallon capacity.

The take-off from this basin is through another 48-inch pipe, 7,000 feet in length, which carries the water through two pressure screen tanks fitted with fine screens for the removal of suspended material large enough to clog the smaller mill lines. From this second 48-inch line, the water is carried 2,300 feet in a 36-inch pipe supported on pile bents in a loop about the mill, from which loop the various mill lines dis-

tribute the water as needed in pulp and paper mill operations.

The maximum capacity of this pipe line system is 50,000,000 gallons per day, only 1,000,000 of which, intended for power boiler use, is subjected to any exacting chemical treatment. The water as taken from the Goose Creek Reservoir is noticeably colored and contains considerable organic material, but after suitable settling, simple treatment and filtration is crystal clear, quite soft and an excellent mill water. Its slight acidity varies somewhat with the season and algae contamination condition, but presents no particular complications.

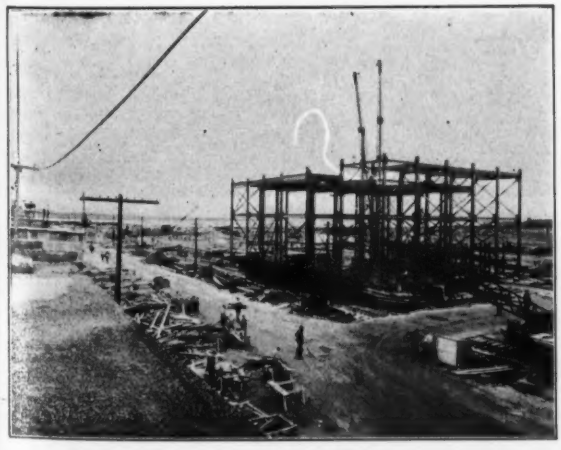
The treatment of the boiler water supply consists essentially in coagulation, a suitable settling period and filtration, followed by a secondary phosphate treatment. The saline concentrations in the steam generators are disposed of by a continuous blowoff with proper heat recovery.

### Steam Generators and Supply

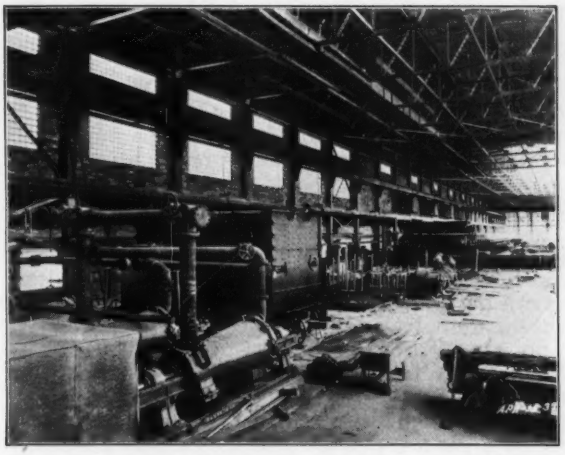
Two large power boilers operate at 600 pounds, 750 degrees, each capable of delivering 225,000 pounds of steam per hour when fired on either pulverized coal or oil fuel. These main steamers, besides being equipped with efficient superheaters, are furnished with air preheaters, flue gas scrubbers for fly ash elimination and water walls of closely spaced tubes on three sides, the bottom of the boiler furnaces being of flat refractory construction. Each boiler has four burners arranged in pairs and toed-in to secure effective turbulence of the products of combustion. Efficient steam washers are also provided to insure clean dry steam and full automatic combustion control.

Four 3-drum waste heat boiler, recovery process units, three of one make and one of another, for operation with black liquor, also generate steam at 600 pounds with superheat bringing the steam temperature to 700-725 degrees. The capacity of one of these units, when handling 2,700 pounds of black liquor concentrated to 55 per cent solids, is 52,000 pounds of steam per hour. These recovery units are all equipped with soot blowers, metering and control equipment, as well as superheaters, and effect highly efficient scrubbing and chemical recovery.

A bark burning, forced draft unit, with superheater, air preheater and 7,293 square feet of heating surface supplies an additional 48,000 pounds of 600-pound steam per hour raised to a temperature of 700 degrees. This unit is also provided with oil burners to permit operation on oil when the occasion demands.



Steel Erection Followed Closely on Foundation Setting. Pan Room Takes Form.



Tile Walls Lend Themselves to Functional Diffused Daylight. Building Constructions Secured by the Insert of Glass Brick Panels.

A highly efficient system of combustion control is provided for the two main power boilers, which supply 77 per cent of the steam generated at the plant, and admirable complements of indicating, recording and regulating instruments for all three sources of steam supply—power boilers, recovery units and bark burner. These instruments are outstanding and will be referred to further in notes on power plant equipment.

### Turbines and Generators

The steam supply at 600 pounds, the pressure now standardized upon in all but one of the older of West Virginia's great mills and at Charleston adopted for three independent groups of steam generators, is utilized by two 7,500 kva. turbine-generators, a condensing unit bled at 20-35 pounds and a non-condensing unit bled at 150 pounds and exhausting at 20-35 pounds. These large prime movers supply all the power required for the many mill operations and also feed into the local utility lines most of the time. As a result, the power load is comparatively constant and the power needs of the plant, as well as its steam demands, are amply cared for at extremely low unit cost.

As the turbines act as power generating reducing valves and are the only source of normal steam supply to the processes at 150 pound and low pressures, desuperheaters and reducing valves are provided to bypass and control the supply of steam to the 150 pound and low pressure steam headers. A full complement of regulating instruments and controls are also of great help in holding down costs.

### Materials Handling

Efficient materials handling equipment likewise contributes to the economy of power plant operation, as it does also in the low cost transfer of logs in the wood yard, in taking the wood chips from the screen house to the digester building and in handling the

wood pulp stock in the screen room. In the aggregate, between 1,300 and 1,400 feet of 16, 24 and 36 inch belt conveyors are in service and about 6,000 feet of log chain hauls in the wood yard.

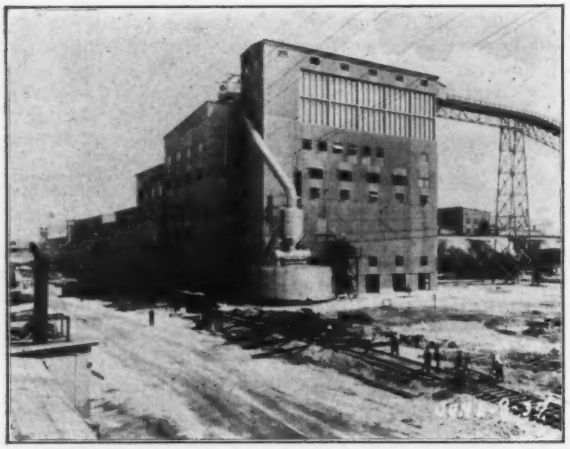
The coal handling equipment, which includes a track hopper and apron feeder of 100 tons per hour capacity, consists of a 24-inch x 205 foot belt conveyor carried on structural steel supports, a 21-inch x 6 foot 6 inch reciprocating feeder discharging to a 16-inch x 255 foot belt conveyor furnished with a self reversing and self propelled tripper—the latter for discharging the coal to the fuel bunkers. There is also a circular bin provided for coal storage and the 16-inch conveyor carries an ingenious weighing device by which the tonnage carried by the belt is automatically recorded.

A 36-inch conveyor almost 700 feet in length handles the wood chips between the screen house and the digester building—at present, at a rate of 75 tons per hour. This conveyor can be speeded up, however, and it is planned ultimately to have it pass 150 tons of chips per hour. A second wood chip conveyor, 24 inches wide and about 42 feet in length, handles the wood chips after screening—at a speed of 32 tons per hour.

Two belt conveyors in the screen room greatly expedite the movement of the wood pulp stock. They are 24 inches wide and 72 feet long, carried on structural steel supports.

### Digester Blow-Off Condenser

The digester room houses five all-welded digesters of noteworthy size, being 11 foot 3 inches in internal diameter and almost 50 feet from flange to flange, and a rather novel horizontal digester blow-off condenser mounted directly over a covered hot water storage tank. This condenser is 56 inches internal diameter and some 18 feet in overall length. Steam enters an upper central port, flanked on either side by water inlets, and passes to the bottom of the condenser, where it is divided and passed to each side. The water enters from above and is distributed by means of perforated decks, while the condensing section of the unit consists of triangular pieces of California redwood rigidly held in place by cast iron supports. The water and steam flow counter-currently through this section, where the steam is condensed and the non-condensible gases escape through vents at the upper ends of the condenser and the hot water drains by gravity into the storage tank below.



PROTECTED METAL ROOFING AND SIDING COVER THE DIGESTER BUILDING, PAN ROOM, JORDAN ROOM, CHIP HOUSE AND MACHINE SHOP.

The condenser handles all steam flashed from the contents of 11 ton sulphate digesters when blown down and the estimated heat recovery is 21,500,000 Btu. per blow. Water is supplied to the condenser in proportion to the flow of steam—a maximum rate of 8,500 gallons per minute at 85 degrees being obtainable—so that the heated water is maintained at a constant temperature of approximately 132 degrees. This hot water is taken from the storage tank and used for pulp washing in the blow pit.

### Recovery and Reclamation

The handling of the black liquor from the wash pans to the recovery furnaces previously mentioned and the caustic plant is, also of especial interest, exemplifying as it does the advanced, efficient and economical, practices general throughout the plant. This first step in this stage of the recovery process is to pass the liquor through an efficient rotary screen, to remove all traces of entrained fibre. The strained black liquor, collected in capacious storage tanks is then fed to large vertical tube, film type, evaporators of distinctive construction and high efficiency.

These evaporator units, among the largest of the type ever built, contain seven so-termed "bodies" and are connected for normal operation so as to secure quintuple effect. That is, three of the bodies are arranged for parallel steam flow, any two of which can be operated as the first effect, while the third body serves as a spare unit. The other four bodies comprise the second, third, fourth and fifth effects respectively.

By an ingenious arrangement of vapor and liquor piping, any one of these four bodies can be cut out of service and the remaining units operated as a "quadruple." Whether run as a quadruple or a quintuple, the black dilute liquor is fed to one effect and after a single pass through its tubes is transferred by pump to the next effect and so on, securing in this way unusually high liquor velocity, which is conducive to high rates of heat transfer and rapid, active boiling.

These evaporators provide great ease of control and with the special separators with which they are furnished the condensate water is crystal clear. Also, owing to the rapid circulation of the liquor and the extended tube length secured by the "body" construction the steam consumption by the units is decidedly low, as compared with the steam demands of other types of evaporators.

The caustic plant, where the reclamation of lime mud and green liquor is effected in a continuous causticizing system is another example of advanced practice cutting costs. The continuous, uninterrupted movement of all solid and liquid process materials thus secured is, in fact, so much more efficient and economical than the intermittent progressions practiced in the old batch and semi-batch systems that 80 or more per cent of the new sulphate mills in the South have now adopted continuous recausticizing.

### Pulp and Kraft Liner Production

The pulp mill equipment at Charleston is throughout of this same high order and the practices followed in pulping as well as in machine room operations are those of modern, approved procedure at its

best—economical and expeditious. The policy of West Virginia has clearly been to install only equipment of proven merit, as demonstrated for the most part by extensive experience gained with the equipment in other of the company's pulp and paper mills. For this reason, the appended random notes on West Virginia's mill equipment are of more general interest than a necessarily sketchy description of the various pulp making processes, presenting as they do a sort of directory of good equipment and practice.

The provisions made for and the method of preparing the blended rosin and wax size employed is, however, deserving of some special mention. Briefly, the procedure is to load electrically heated melt tanks with the desired proportions of rosin and wax, the chief raw ingredients, and after these have become suitably fluxed to pump the mixture and a prepared alkaline solution of caustic soda through emulsifying apparatus. In so doing, the alkali combines with the rosin to form a soap, through which the wax is dispersed in fine particles.

This mixture is then suddenly chilled below the melting point of the wax, congealing the wax in its finely divided state, to form the size stock. This concentrated caustic, or thick size, is pumped to storage tanks, from which it is taken as required to make-up solutions of dilute size of proper strength for use in the jordans.

In diluting the size, the added water is kept circulating in storage tanks and the thick size in carefully measured proportions is injected into the intake of the circulating pump, thus effecting prompt dilution without the use of hot water or steam. As required, this dilute size is pumped through controlling and metering devices to the dispersion machine.

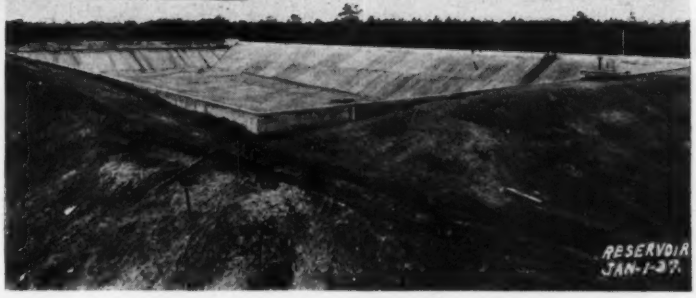
Close instrumentation is also exercised in the size blending process, a 3-pen recording thermometer registering simultaneously the temperature of the molten rosin and wax, the temperature of the caustic solution and the exit temperature of the prepared size. In this manner a permanent record of each daily run is kept, furnishing accurate check on production control.

### Machine Room Features

Interest centers in the paper mill proper upon the 242-inch Fourdrinier kraft liner machine, one of the largest built to date. The Fourdrinier part alone is 93 feet long, equipped with 40-inch suction roll, ten suction boxes and an adjustable shake. The press part has two 38-inch suction presses and a feltless third press, while the dry part consists of four sections made up of twenty 60-inch cylinders—a total of eighty drying cylinders—with provisions for the accommodation of an additional section of twenty driers. There are also two stacks of calenders, a large reel, winder and an auxiliary 4-drum winder for running off special shipping rolls. The machine sections are driven by individual motors, providing a speed range of from 350 to 1,400 feet per minute.

For handling the large amounts of stock required, the flow box is made of ample proportions of a two-compartment design, with an intake compartment connected to the stock piping, while a large perforated motor-driven roll is provided in the flow space ahead of the apron to serve as a current breaker and stock distributor. The construction consists of light steel plate stainless clad on the inside, supported on a rigid structural framework with interior wood partitions and baffles.

There are numerous other mechanical refinements in both the wet end and drier sections and in the enclosed gear drive with which the machine is provided, the full value of which becomes more apparent as the giant machine continues its smooth, effective production of kraft liner. One of these, the air operated paper machine drier control secures its primary impulse from the tension roll of the machine and resets the control temperature automatically. With each change in sheet tension an impulse is communicated through a hydraulic transmission




10,000,000 Gallon Concrete Reservoir and Settling Basin Takes Form in Seventy-five Days.

system and the "set" temperature of the control instrument raised or lowered sufficiently to re-adjust the sheet tension and the corresponding moisture content of the sheet.

During periods when the sheet tension is uniform, this drier regulator functions simply as a sensitive temperature controller, maintaining closely the proper degree of heat, so that the results attributable to this relatively new drying control system are:

1. Moisture control of the sheet within exceptionally close limits.

2. Stabilized uniform steam flow to the driers, providing uniform heat input to the sheet under uniform conditions of weight and other factors that affect drying.

3. Anticipatory correction for changes in the pressure and temperature of the steam supply to the driers, since the temperature control repositions the steam control valve before the change affects the sheet.

4. Elimination of much manual attention in resetting the control to meet various operating conditions.

When a break occurs with this system, the tension roll instantly trips an auxiliary solenoid valve and shuts off the steam to the driers, thus guarding against the rolls becoming overheated while the sheet is off. On refeeding the sheet to the driers, the tension roll is automatically brought back to position, the shut-off valve opens and the system is again in full operation.

### Great Panel Hood Arrests Attention

To expedite the sheet drying still more and improve drying effectiveness, the Charleston machine is furnished with a panel hood 252 feet long—held to be the longest ever built—with seven dormer outlets connecting to seven large, full housed, exhaust fans mounted on the roof over the paper machine drive. This panel type construction of hood permits the removal and replacement of individual sections without disturbing the balance of the assemblage.

The air supply makeup to replace the moisture laden air withdrawn by the fans is admitted in two places and by two methods: by distribution of air through duct work over the roof and by a supply of fresh air directed against, or applied to, the bottom felts of the machine. The first of these methods serves to prevent, or at least reduce, condensation on the roof, while the second keeps the bottom of the felts dry and in good condition, also helping to increase the production of the machine or decrease the required steam pressure on the driers.

### Calender Stacks Permit Growth

The two large, 234-inch face, calender stacks have each, as installed at Charleston, six rolls—a 34-inch roll at the bottom, then a 20-inch, with three intermediate 18-inch rolls capped by a 20-inch top roll. Provision is made, *i.e.*, accommodation provided, however, for two additional rolls, if and when desired.

The stacks are provided with electric lifts, operated from the floor, and the babbitted roll bearings are effectively water cooled. These bearings are also lubricated by a gravity feed oiling system with individual leads to each bearing, the bottom roll bearings having five leads each to insure adequate lubrication.

### Drainage Control

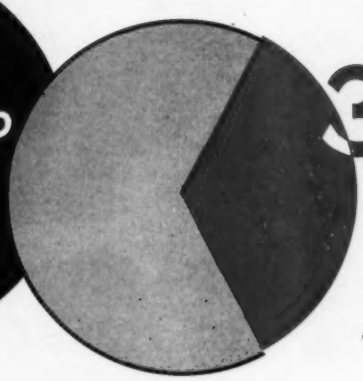
The drainage of the drier cylinders is simple and highly efficient, conserving considerable power, increasing wire life and overcoming most of the difficulties common to holding suitable vacua on the flat boxes under the Fourdrinier wire. Each drier cylinder has in effect its individual drainage system, consisting of comparatively small diameter syphon pipe assemblages connecting the individual boxes with the couch vacuum supply system.

At the bottom of each syphon, in advance of its discharge into the return

CYLINDRICAL PUMPING STATIONS, GOOSE CREEK RESERVOIR, READY FOR 38,600 GALLONS PER MINUTE PUMPS IN TWO MONTHS.

# B&W-TOMLINSON RECOVERY PROCESS

**41** UNITS INSTALLED OR ON ORDER SINCE JULY 1935

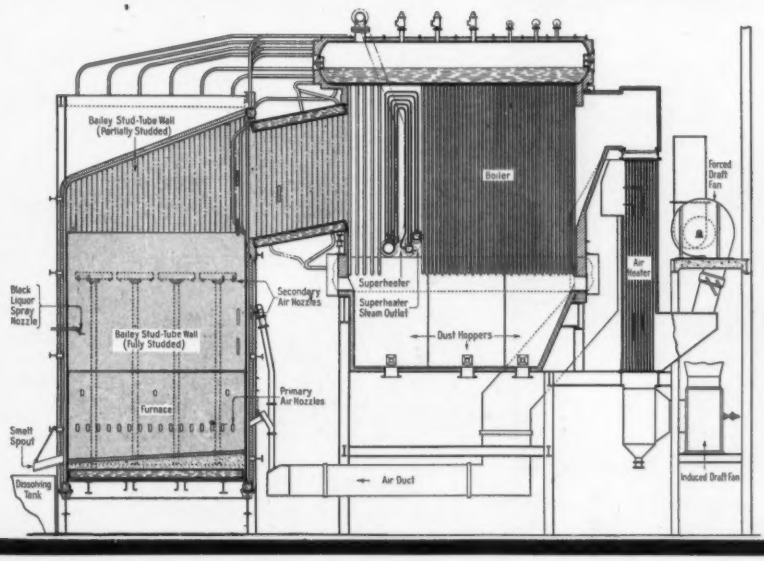


**35 per cent** *ordered by previous users*

That satisfactory results are being obtained from the B&W-Tomlinson Recovery Process is shown by the fact that more than a third of the units ordered to date have been for the two companies that made the first use of this process in the United States. One company placed its original order for two units, and later bought ten more. The other company ordered four, following its first installation of three units.

The total capacity of these units, original and repeat installations, is equivalent to more than 1900 tons of pulp per day.

**THE BABCOCK & WILCOX COMPANY**
**85 LIBERTY STREET NEW YORK, N. Y.**




B&W-Tomlinson Recovery Process with Bailey Fully-Studded Water - Cooled Furnace, B&W Three-Drum Boiler, and Air Heater for operation with black liquor from southern slash pine.

BL3

**BABCOCK & WILCOX**

condensate header, is installed a swing check valve which plays a highly important role. The water of condensation traveling down though the syphon opens this valve just enough to pass the water into the return header at exactly the same pressure as in the drier served, the valve operating as an orifice accurately attuned to the conditions of flow, or passage, of condensate. The water at substantially the temperature of the steam in the drier is carried by gravity into a small seal tank, the water level in which controls the rate of pump discharge, and the hot water without appreciable loss of heat is returned to the boiler house.

On Monday morning, or whenever the paper machine is started-up, large thermostatic traps on the return header permit a rapid withdrawal of the air accumulated in the driers and while this is being done and the driers heated, the check valves at the bottom of the syphons are held wide open—are, in effect, bypassed. As soon as the air has been completely pumped from the driers and steam commences to pass through to the return header, the thermostatic traps close and the pressure in the return header at once rises to that in the drier cylinder, separation of water and air then taking place at the separating tee which discharges to the seal tank.

Similarly, throughout the paper mill, pulp mill and power plant—in fact, everywhere at this recent southern development—are examples of far visioned refinements in machines and equipment, as well as of operating methods, of production tools of unexcelled merit, of modern instrumentation and automatic controls, and splendid working facilities. In these respects the new kraft mill at Charleston is outstanding.

### Directional and Executive Personnel

The responsibility of tieing all the many undertakings involved into the smooth running enterprise the plant is destined to become, has been the duty, well discharged, of G. R. Wadleigh, chief engineer, West Virginia Pulp and Paper Company, and his associates. M. C. Tuttle, head of the engineering firm of Morton C. Tuttle, general contractor, ably executed Mr. Wadleigh's plans and did much to make this achievement possible. The same may be said of Malcolm Pirnie, civil engineer, and his staff who handled the hydraulic work in connection with the water supply system.

48-INCH CONCRETE PIPE LINE CARRIES 50,000,000 GALLONS PER DAY THROUGH TWO PRESSURE TANKS FITTED WITH FINE SCREENS.

### Machinery and Equipment

Much aid was also rendered by the many manufacturers of equipment and vendors of materials and supplies placed in this Charleston kraft mill, chief among which are:

PILING:
Tidewater Construction Company, Norfolk, Va.

BUILDING MATERIALS:
H. H. Robertson Company, Pittsburgh, Pa.—Siding.
William Bailey Company, Springfield, Ohio—windows.
Owens-Illinois Glass Company, Toledo, O.—Glass brick.
National Fireproofing Company, Pittsburgh, Pa.—Tile.
Virginia Bridge & Iron Company, Roanoke, Va.—Steel.

CONVEYOR CHAIN:
Chain Belt Company, Milwaukee, Wis.
Jeffrey Manufacturing Company, Columbus, Ohio.

BARKING DRUMS, CHIPPERS AND CRUSHERS:
D. J. Murray Manufacturing Company, Wausau, Wis.

CHIP SCREENS:
Orville Simpson Company, Cincinnati, Ohio.

BELT CONVEYORS:
Robins Conveying Belt Company, New York, N. Y.

DIGESTERS:
Combustion Engineering Company, New York, N. Y.

WASH PANS, STOCK CHESTS, CYCLONES AND TANKS:
Chattanooga Boiler and Tank Company, Chattanooga, Tenn.

PUMPS:
Goulds Pump Company, Seneca Falls, N. Y.
Morris Machine Works, Baldwinsville, N. Y.
Warren Steam Pump Company, Warren, Mass.
Ingersoll-Rand Company, Phillipsburg, N. J.
Deming Company, Salem, Ohio.
Worthington Pump and Machinery Company, Harrison, N. J.

ELEVATORS:
Otis Elevator Company, New York, N. Y.

SCREENS, KNOTTERS, PULP THICKENERS, LIME SLUDGE THICKENERS, VACUUM WET MACHINE:
Improved Paper Machinery Corporation, Nashua, N. H.

AGITATORS:
Pulp Bleaching Corporation, East Orange, N. J.

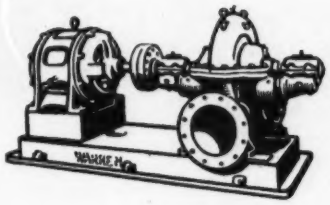
VACUUM PUMPS:
Nash Engineering Company, South Norwalk, Conn.

RECOVERY UNITS:
Combustion Engineering Company, New York, N. Y.
Babcock & Wilcox Corporation, New York, N. Y.

CAUSTICIZING EQUIPMENT:
Dorr Company, New York, N. Y.

FIRE BRICK:
General Refractories Company, Philadelphia, Pa.
Harbison-Walker Refractories Company, Pittsburgh, Pa.

● WARREN STEAM PUMP COMPANY INCORPORATED U. S. A. ●



*and the pumps are by* **WARREN**

West Virginia engineers do not choose pumps blindly. Why Warren?

Because in the years they have used Warren pumps they have found

them meeting all the pumping requirements of the modern mill. In the

new mill? The Warren centrifugal pumps recently installed will uphold

the high record Warren has established and maintained in the past.

**WARREN STEAM PUMP COMPANY INC.**
**WARREN, MASSACHUSETTS, U. S. A.**

4107

● WARREN STEAM PUMP COMPANY INCORPORATED ● WARREN STEAM PUMP COMPANY INCORPORATED ● WARREN STEAM PUMP COMPANY INCORPORATED ● WARREN STEAM PUMP COMPANY INCORPORATED ●

● WARREN STEAM PUMP COMPANY INCORPORATED U. S. A. ●

EVAPORATORS:
Goslin-Birmingham Company, Birmingham, Ala.

LIME KILNS:
Traylor Engineering and Manufacturing Company, Allentown, Pa.

PIPE:
Lock Joint Pipe Company, Ampere, N. J. (Water and Sewer)—Concrete.
Lynchburg Foundry Company, Lynchburg, Va.—Cast iron.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.—Steel.

WATER SUPPLY PUMPS:
Turbine Equipment Company.

POWER BOILERS:
Riley Stoker Corporation, Worcester, Mass.

BARK BURNING BOILER:
Babcock & Wilcox Corporation, New York, N. Y.

PIPE COVERING:
Philip Carey Manufacturing Company, Lockland, Ohio.
Chas. S. Wood & Company.

AIR COMPRESSORS:
Chicago Pneumatic Tool Company, New York, N. Y.

INDUCED DRAFT FANS:
B. F. Sturtevant Company, Boston, Mass.
Clarage Fan Company, Kalamazoo, Mich.

TURBINES AND GENERATORS:
Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

FEED WATER HEATER:
Ellicott Company, Jeannette, Pa.

VALVES:
Chapman Valve Manufacturing Company, Indian Orchard, Mass.
Record Foundry and Machine Company, Livermore Falls, Me.
Pratt & Cady Company, Inc., Bridgeport, Conn.
Darling Valve and Manufacturing Company, Williamsport, Pa.

GEARS AND GEAR REDUCERS:
Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.
Louis Allis Company, Milwaukee, Wis.

CAUSTIC PLANT, SHOWING DITCH FOR WATER MAIN AND SEWER.

242-INCH FOURDRINIER KRAFT LINER MACHINE DOMINATES MACHINE ROOM. NOTE GREAT PANEL HOOD IN BACKGROUND AND DIFFUSED LIGHT FROM GLASS BRICK PANELS.

Boston Gear Works, North Quincy, Mass.
U. S. Electric Motors Inc., Los Angeles, Cal.

MOTORS:
General Electric Company, Schenectady, N. Y.
Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.
Reliance Electric and Engineering Company, Cleveland, O.
Louis Allis Company, Milwaukee, Wis.
Electric Machinery Manufacturing Company, Minneapolis, Minn.

TRANSFORMERS:
General Electric Company, Schenectady, N. Y.

WINDER:
Cameron Machine Company, Brooklyn, N. Y.

REWINDER:
Moore & White Company, Philadelphia, Pa.

WIRE:
Anaconda Wire and Cable Company, New York, N. Y.
Okonite Company, Passaic, N. J.
John A. Roebling's Sons Company, Trenton, N. J.
General Electric Company, Schenectady, N. Y.

SWITCHING EQUIPMENT:
Wolfe & Mann Manufacturing Company, Baltimore, Md.
General Electric Company, Schenectady, N. Y.
I. T. E. Circuit Breaker Company, Philadelphia, Pa.
Cutler Hammer Inc., Milwaukee, Wis.
Allis-Chalmers Company, Milwaukee, Wis.

PAPER MACHINE:
Pusey & Jones Corporation, Wilmington, Del.

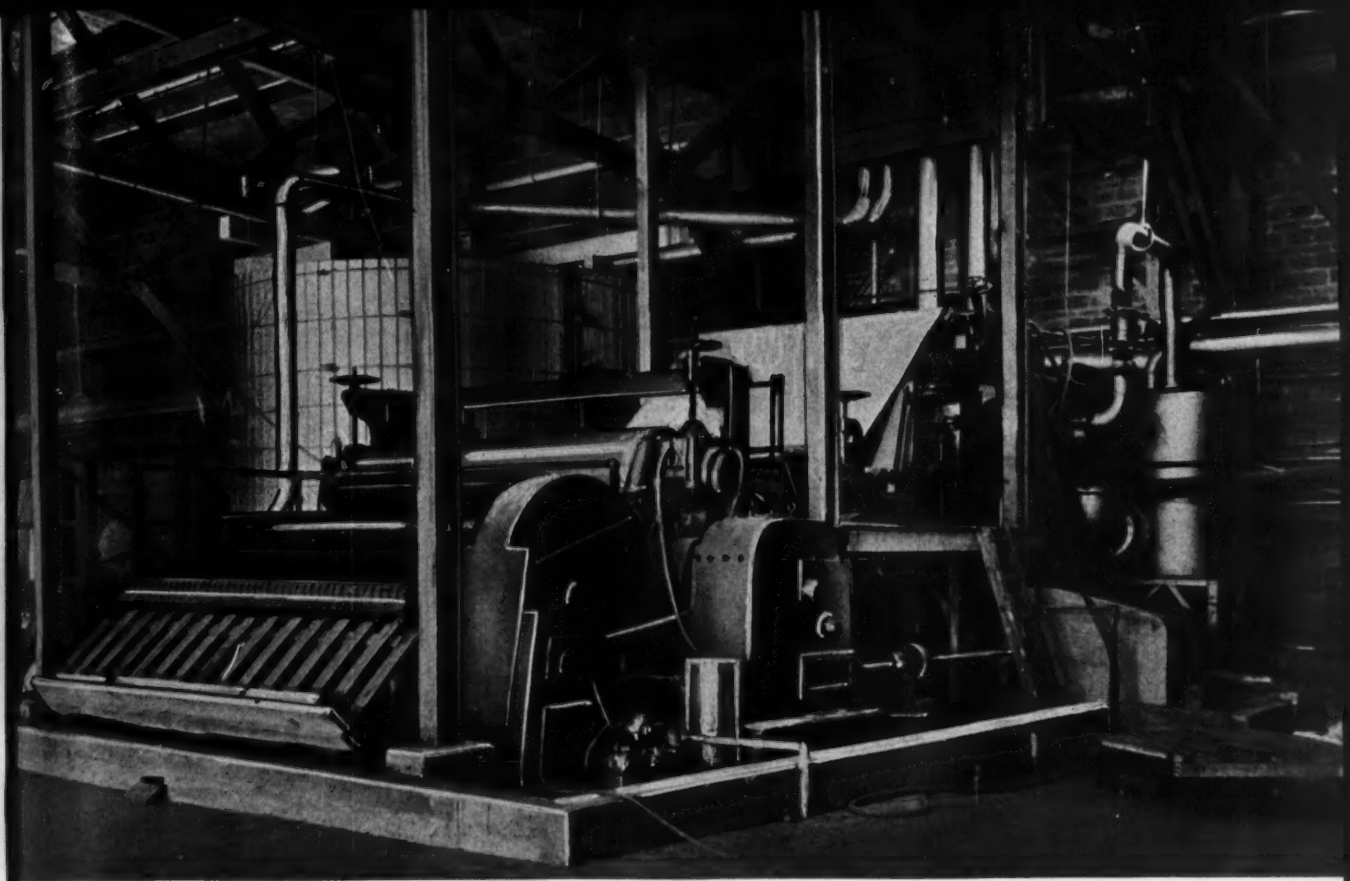
PAPER MACHINE CALENDERS:
Farrell-Birmingham Company, Ansonia, Conn.

PAPER MACHINE DRIVES:
Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

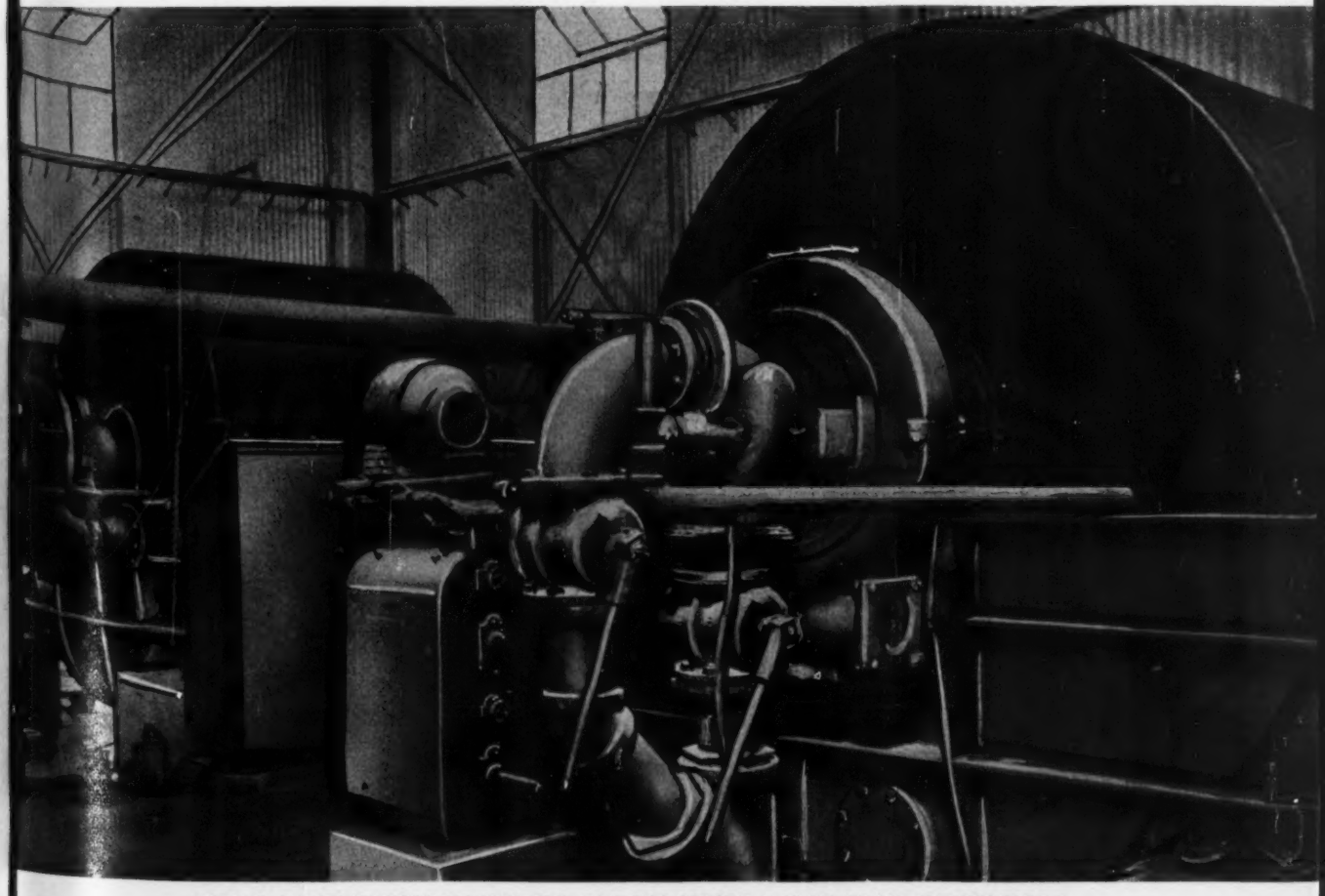
FLAT BOX DRAINAGE EQUIPMENT:
A. E. Broughton & Co., Glens Falls, N. Y.

SIZE MAKING EQUIPMENT:
Bennett, Inc., Cambridge, Mass.

ROLL GRINDER:
Farrel-Birmingham Company, Ansonia, Conn.



IMPCO HYDRAULIC 120" WET MACHINE WITH HIGH DENSITY VACUUM WET END



TWO OF THE THREE IMPCO 8' DIAMETER LIME SLUDGE FILTERS

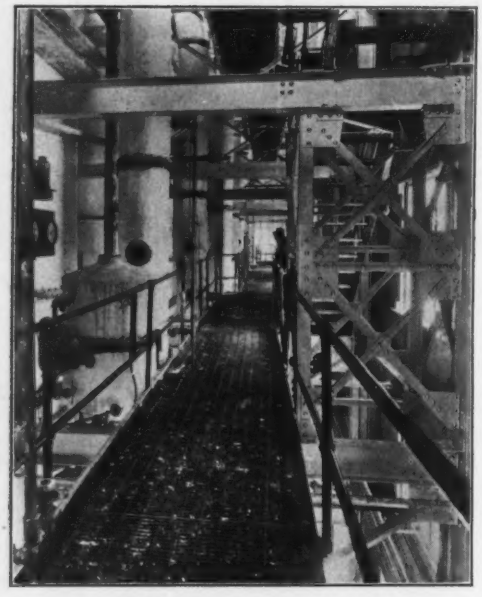
# Notes on Mill and Power Plant Equipment of West Virginia at Charleston, S. C.

The selection of equipment for the Charleston plant was made with the utmost care on the part of West Virginia Pulp and Paper Company's engineering department and the reasons for the choices made, specifications of equipment installed and considerations of this nature are of interest, obviously, to the entire paper making industry. To cover adequately all the equipment placed or to make an inventory of the equipment for even a specific part of the great mill would be, naturally, more of an undertaking and require more space than is available in these pages. However, the brief random notes which follow, setting forth as they do specific information furnished by manufacturers and vendors of some of the equipment installed, do give, at least, a spotty picture of the equipment needs of a modern pulp and paper mill.

Based on information supplied by and presented under the name of the vendor, then, some information of this specific character is:

### Jeffrey Manufacturing Co.—Chain Belt Co. Robins Conveying Belt Co.—Otis Elevator Co.

The large amount of chain for the wood yard was supplied by The Jeffrey Manufacturing Company of Columbus, Ohio, and Chain Belt Company, Milwaukee, Wis., the former furnishing its well known combination chain with all necessary attachments, drives, sprockets, supports, etc., while Chain Belt Company furnished a special chain which avoids in large measure the wear and grinding action prevalent usually on the inside of the forward barrel of block link chains as they seat themselves against the sprocket teeth. Extra metal is added on the rear barrel, thus forcing the forward barrel out of contact with the sprocket teeth at the point where the grinding normally occurs, while the rear barrel seats itself naturally on the sprocket tooth without grinding action.



*Courtesy of Goslin Birmingham Mfg. Co., Inc.*

OPERATING PLATFORM OF LONG TUBE, RAPID CIRCULATION, BLACK LIQUOR EVAPORATOR, SHOWING DOWN LEGS AND FLASH POTS.

Freezing and sticking of the chain is avoided by providing a chamber, or enlargement of the bore, in the block link on the non-bearing side of the pin. Foreign materials are prevented with considerable success from entering these chambers by the closed ends of the barrel which fit snugly around the pin. The special metal in which these chains are cast is 30 per cent stronger than a good grade of malleable iron and its hardness measured on the Brinell scale 60 per cent greater. The metal is corrosion resistive and possesses high wear resisting properties.

The extensive belt conveyor systems, with all auxiliaries and appurtenances, were supplied by Robins Conveying Belt Company and the small, geared service elevator and shore sidewalk type lift by the Otis Elevator Company.

### Combustion Engineering Co.—Goslin-Birmingham Manufacturing Co.

Five large all-welded digesters, 11 feet 3 inches in internal diameter and 49 feet 6 inches between flanges were furnished by Combustion Engineering Company, while Goslin-Birmingham Company, Inc., built and installed the large vertical tube, film type, black liquor evaporators and rotary screens, with 378 square feet of filtering surface. The capacity of the giant evaporators, when supplied with steam at 25 lbs. gauge pressure and with 27 inches vacuum at the condenser, is 176,000 lbs. of water per hour. This is approximately the equivalent of 300 tons per day of pulp production.

### Some of the Numerous Pumps

The pumping equipment installed at the Charleston plant covers a wide variety of units, each carefully selected for its suitability for some specific service. Complete specifications or even a list of all the pumps are not yet available, but some pertinent information regarding seventy-five of the pumps follows:

### Morris Machine Works

Three stainless steel shaft slurry pumps, with water-cooled stuffing box hubs, direct connected to 10-hp. motors, were furnished by the Morris Machine Works. These pumps, which are used in connection with the black liquor evaporators, have a capacity of 150 gallons per minute and handle black liquor containing 55 per cent solids at a temperature of 242-degs. The same company supplied thirty-five other pumps as follows:

Four nickel semi-steel, 8-inch pumps, direct connected to 30-hp. splash-proof motors, for circulating

# GOSLIN BIRMINGHAM
## MANUFACTURING COMPANY, INC.

General Offices and Works
**BIRMINGHAM, ALA.**

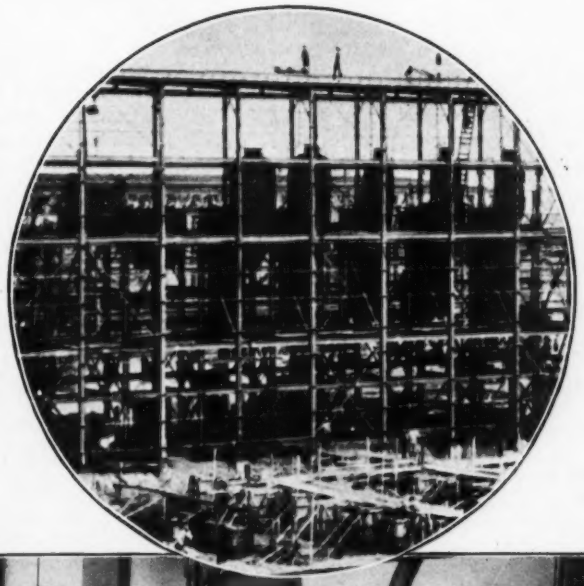
New York
Chicago

New Orleans
San Francisco

## MODERN EQUIPMENT
for the
## PAPER INDUSTRY
FILTERS, EVAPORATORS, CONDENSERS, HEATERS,
DIGESTERS, REPLACEMENTS

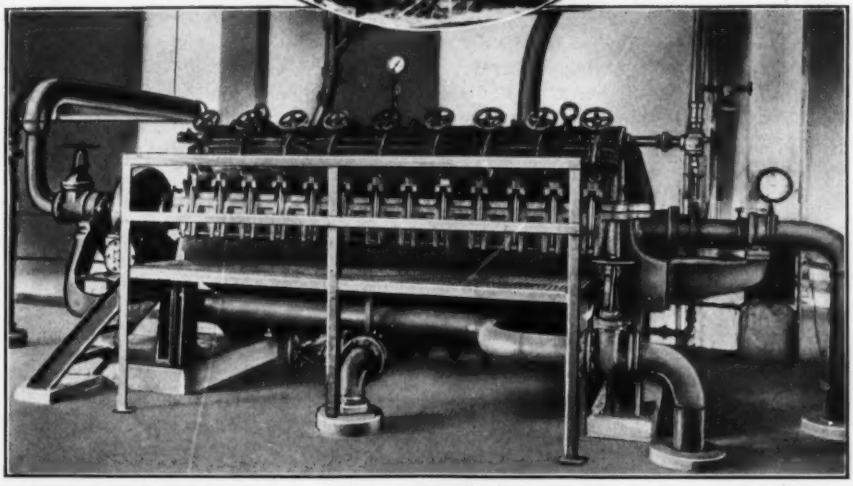
### EVAPORATORS

Seven body, quintuple effect evaporator of the long tube, rapid circulation type, for concentrating all the black liquor to 55% solids — provided for improved type separators to limit entrainment losses and with automatic controls for simplified operation.



### FILTERS

Charleston repeats with a Vallez Filter to handle black liquor feed to evaporators—previous installations have demonstrated cleanliness of filter station inherent in closed pressure operation and recovery of all the fiber resulting in improved evaporator practice.



liquor in sulphite digesters, each capable of handling 1,650 gallons per minute of 350-degs. liquor against a 50-foot head. The rotating element of these pumps is made of stainless iron. Another of the Morris pumps is of all nickel iron solid shell side suction type direct connected to a 50-hp. motor. This pump handles weak liquor to the pan sprays and with a 6-inch outlet discharges 1,000 gallons per minute. A similar pump, but direct connected to a 30-hp. motor, was furnished to handle 600 gallons of strong black liquor to the pre-heater in the pan room. Also in the pan room is the same size of pump direct connected to a 50-hp. motor for handling strong black liquor to the rotary filter and storage tank.

In the digester building is an 8-inch Morris pump handling 1,200 gallons per minute of hot water supplied the pan sprays. For handling green liquor in the causticizing system, the same pump maker furnished three 1½-inch pumps driven by 5-hp. motors and discharging 150 gallons per minute. The green liquor supply to the clarifier is handled by a 6-inch pump of the same make, driven by a 10-hp. motor and delivering 500 gallons per minute. A similar pump driven by a 15-hp. motor handles the green liquor delivered to the causticizers at a rate of 800 gallons per minute.

Also in the reclaiming plant, two 3-inch discharge Morris pumps are used between the lime slackers and causticizers, passing 400 gallons per minute. A 6-inch pump, driven by a 10-hp. motor, handles 400 gallons of the liquor passing from the causticizers to the feed tanks per minute, while from the feed tank to the clarifiers a 4-inch, 400 gallons per minute, 7½-hp. unit does the pumping. The white liquor is handled between storage and the preheater by two 6-inch, 600 gallons per minute, pumps driven by 30-hp. motors and the lime sludge is pumped to the filters by two 3-inch units driven by 10-hp. motors and discharging 300 gallons per minute. Still another Morris pump in the reclaiming plant is a 6-inch unit driven by a 10-hp. motor which handles 500 gallons of weak liquor taken from storage per minute. All these caustic plant pumps are made of semi-steel and are driven by horizontal splash-proof motors of normal low torque starting current type.

The Morris Machine Works also furnished a 6-inch, 800 gallons per minute pump for handling the 10-deg. liquor delivered to the evaporator, driven by a 15-hp. motor and a little 1½-inch pump driven by a 5-hp. motor for handling 150 gallons of the 10-deg. liquor per minute pumped to the supply tank in the warehouse. Another of the small warehouse pumps of the same make is a 1½-inch unit taking the solution from the dissolvers to the storage tank in the recovery plant, driven by a 7½-hp. motor and passing 150 gallons per minute. A 4-inch, 300 gallons per minute pump driven by a 5-hp. motor pumps the liquor from the supply tank in the warehouse to the salt cake dissolver. A 1½-inch pump, driven by a 7½-hp. motor takes the salt cake solution from the storage tank to the mixers in the recovery pit, while a 3-inch pump, driven by a 10-hp. motor, takes the final mixture from the mixer to the disc evaporators at a rate of 400 gallons per minute.

A 3-inch, 400 gallons per minute, pump of similar make and driven by a 10-hp. motor takes 38-deg. liquor from the storage tank to the mixer. Finally, there are five vertical sump pumps built by the Morris Machine Works and direct connected to 5-hp. motors. These are used in the sumps of the pan and digester buildings, the sump of the evaporator building, in the caustic plant and to handle the starch delivered to the calender machine room, all being of nickel iron construction and direct connected to motors.

### Warren Steam Pump Co., Inc.

The pumps furnished by Warren Steam Pump Company, Inc. for the Charleston plant, together with the service they discharge are:

| Type of Pump | Handling |
|---|---|
| 2— 12-in. single stage, single suction... | Raw stock from wash pan |
| 2— 18-in. single stage, double suction... | Stock tank to thickeners |
| 1— 6-in. single stage ..... | Rejects from screens |
| 1— 10-in. single stage, single suction... | White water tailings box to tank |
| 2— 14-in. single stage, double suction... | Water tank to screens |
| 1— 5-in. single stage, double suction... | Wash water |
| 1— 4-in. single stage, double suction... | Cold water tank to pan spray |
| 1— 18-in. single stage, double suction... | White water to machine |
| 3— 4-in. single stage, double suction... | Water service |
| 1— 3-in. single stage, double suction... | Evaporator condensate |
| 1—1½-in. single stage, single suction... | Strainers—water supply |
| 1—1½-in. single stage, single suction... | Low pressure drainage |
| 1— 12-in. single stage, single suction... | Back water—syphon pit |
| 1— 12-in. single stage, double suction... | Back water—couch pit |
| 1— 6-in. single stage, double suction... | Showers — sprayers, paper machine |
| 1—1½-in. single stage, double suction... | Hydraulic valve operation |

### Nash Engineering Co.

The contribution of the Nash Engineering Company to the Charleston plant consists of eleven pumps and one compressor, six vacuum pumps of cone type design with a single moving element mounted on shafts carried in ball bearings outside the pump casings, without metal contacts or any gears, for the paper machine; a similar vacuum pump in the pulp mill and several centrifugals. Specifically these pumps, together with the service they discharge, are:

In the pulp mill, there is a vacuum pump serving the two lime sludge filters, a pump to take care of a thickener and washer and two pumps for use on a pulp washer, one of which is a centrifugal white water pump.

On the paper machine, there is a suction pump serving the suction boxes on the wire and five other suction pumps of the same size, three to service the suction couch and one each for the presses. These six pumps are driven at opposite ends of three 225-hp. splash-proof, synchronous motors and the piping is so arranged that the pumps can be transferred to the various services, it being possible to throw all six in parallel to supply the complete requirements of the machine from one header, if so desired. The white water extracted at the suction couch is separated in a tank and handled by a centrifugal pump, the vacuum pumps handling only the air. Water extracted at the presses is, however, passed through the pumps.

A centrifugal pump furnished by the Nash Engineering Company is used in connection with the water supply system. In addition a Nash compressor is used to provide an automatic water supply for the office buildings.

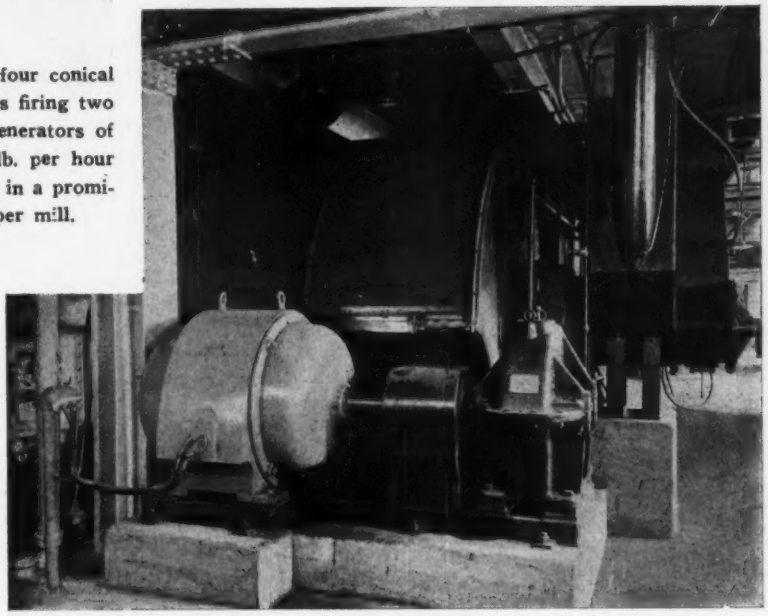
### Turbine Equipment Co.—Deming Co.

The two extremes in Charleston pumps were supplied by the Turbine Equipment Company and the Deming Company. The three main water supply pumps were furnished by the former, the largest at the plant and two tiny chemical feed pumps by the latter.

The three water supply pumps have an aggregate capacity of close to 40,000 gallons per minute, averaging well over 200 gallons per second. The two little precision, single acting vertical pumps used to handle phosphate solution in the water treatment plant discharge only a single gallon per minute, but do so against a head of 700 lbs. per square inch.

# Effective Equipment for Pulp and Paper Mills

## In the power plant



One of four conical ball mills firing two steam generators of 150,000 lb. per hour capacity in a prominent paper mill.

### STEAM GENERATORS

Complete boiler plants to meet modern requirements.

### PULVERIZED FUEL SYSTEMS

Direct-fired and storage systems for pulverizing all coals and coke.

### ECONOMIZERS

Economizers of extended surface, armored construction gives maximum surface in minimum space.

### CONDENSERS

Welded steel shell condensers with steam jet vacuum pumps and all auxiliaries.

### HEATERS AND EVAPORATORS

Evaporators for make-up, process and heat transformer installations; feet water heaters, open and closed types; "Lockhead" construction for high pressures.

## In the Mill

### INDIRECT HEATERS

Economies in steam and chemical costs, together with increased quantity and quality are effected by indirect heating of digester liquor.

### RELIEF-TURPENTINE CONDENSERS

When the pulp contains turpentine, a combined saving of heat recovered from the digester and the production of turpentine may be realized.

### DIGESTERS

Digesters fabricated by Foster Wheeler are built under most modern conditions and designed specifically for individual plants.

### BLOWDOWN HEAT RECOVERY

Systems for recovering heat, from digester blowdown provide clean, hot water for mill processes.

### STEAM STORAGE

Steam storage in Ruths Accumulators, reduces power plant and process costs. Off-peak production of steam is accumulated and released at peak demand. Boilers are fired at a constant rate.

FOSTER WHEELER CORPORATION, 165 Broadway, New York, N. Y.

# FOSTER WHEELER

### Paper Mill Equipment

In the paper mill, all equipment is dwarfed by the immense Pusey & Jones 242-inch Fourdrinier kraft liner machine and the 252-foot panel hood furnished by J. O. Ross Engineering Corporation, though the 60-inch x 60-inch breaker beater supplied by Shartle Brothers also commands attention. The drainage system for the drier cylinders, however, is well deserving of mention, as is also the size making system in use.

### A. E. Broughton & Co.

The drainage system at Charleston, S. C., is the simplest and most efficient method of handling the water from the paper machine driers and as installed cares for the ten flat boxes under the Fourdrinier wire by individual drop legs from each flat box, which set up and hold correct vacuum pulls on each box. No valves are used on the discharge of the flat boxes and more or less water removal is effected by the vacuum accurately set in the boxes by the controller. The separation of the water and air takes place in a separating tee, the bottom of which extends down into the drop leg and the seal tank in the basement.

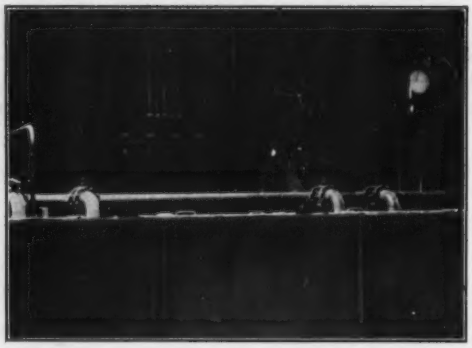
Each flat box is acted upon individually and whatever occurs at one box has no effect on any other box in the line. The vacuum supply comes from the vacuum supply system and no individual flat box vacuum pump is employed.

### Bennett Incorporated

At the Charleston mill, the entire size making system is installed on one floor, occupying approximately 8,000 square feet when taking in the space for the storage of raw materials. The capacity of the plant is 8,000 pounds of size per day, dry weight. This is for the one dispersion machine installed and provision has been made for installing a second dispersion machine to care for the production anticipated.

The rosin and wax are raised to a platform, opened and dumped into melt tanks. These tanks—there are two—are rectangular and hold approximately 10,000 lbs. of melt each. The tanks are heated by 3.8 kw. space heaters, capable of melting a full rosin charge in about eight hours, automatic temperature controllers keeping the molten rosin and wax at the desired temperature. The molten rosin is then pumped from these melt tanks to the blending machine by a 1-hp. pump, the rate of flow into the machine being accurately controlled by a wier.

Dilute caustic soda is also pumped to the blending machine from the dilution tank, which draws its caustic supply from the storage tank in which the consignments of liquid caustic soda at 50 per cent concentration are kept. The dilution tank where the strong caustic is mixed with the required amount of water is heated by steam coils, expediting the dilution and serving to improve diffusion.



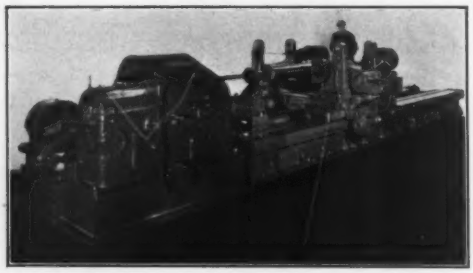
*Courtesy of Bennett Inc.*

MOLTEN SIZE HANDLED AND HELD AT CLOSE TEMPERATURE LIMITS AUTOMATICALLY SET BY TEMPERATURE CONTROLLERS.

### Farrel-Birmingham Co.

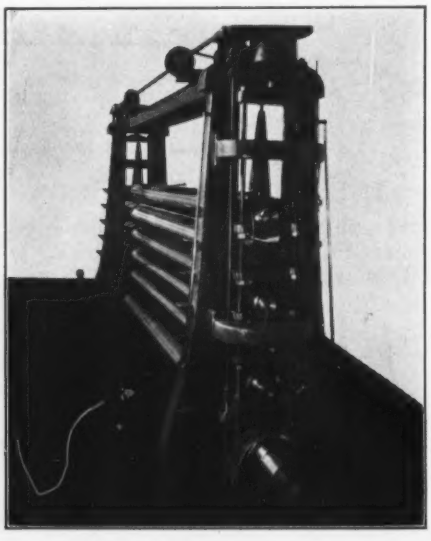
In addition to the two 234-inch, 6-roll calender stacks furnished by the Farrel-Birmingham Company, this concern has installed a 2-wheel, swing rest type grinding machine at the Charleston plant, capable of grinding rolls up to 36-in. diameter by 292-in. face. The head stock drive of this machine consists of two multiple V-belt drives for the first and final reductions, with an interposed herringbone gear speed reducer.

The roll and carriage traverse drives are independent, each being driven by its individual variable speed direct current motor, and the grinding wheels, also driven by multiple V-belts actuated by variable speed direct current motors, are over-hung to facilitate rapid wheel change.



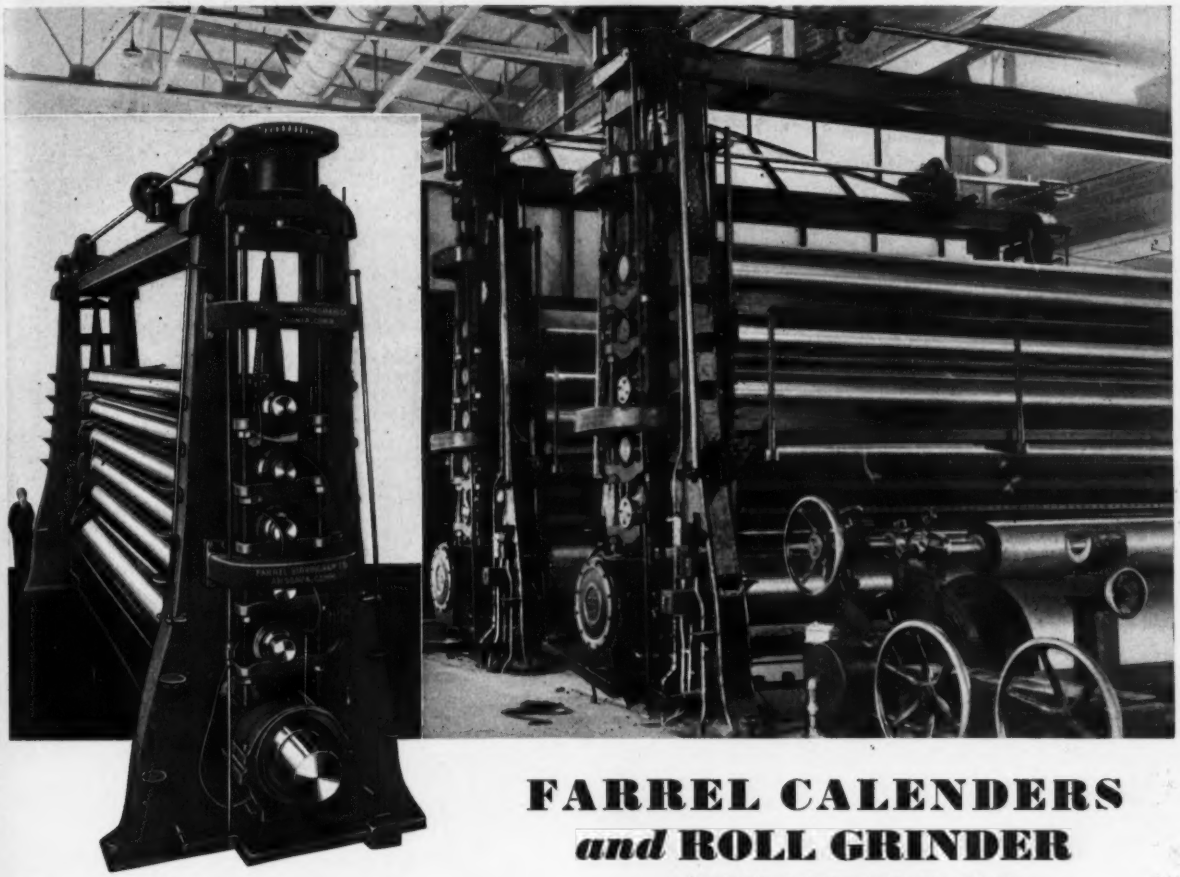
*Courtesy of Farrel-Birmingham Co.*

GRINDER, DRIVEN BY VARIABLE SPEED D.C. MOTOR THROUGH WORM GEAR REDUCTION UNIT, DRESSES 36-INCH SLENDER ROLLS WITH PRECISION AND DISPATCH.

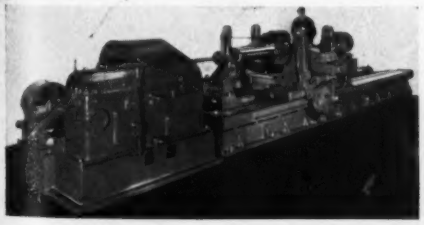


*Courtesy of Farrel-Birmingham Co .*

TWO LARGE 234-INCH CALENDER STACKS HANDLE KRAFT LINER MACHINE OUTPUT AND EACH PROVIDES ACCOMMODATIONS FOR TWO ADDITIONAL ROLLS, IF AND WHEN REQUIRED.



*Above*—One of the 234″ Farrel Calender Stacks built for Westvaco's Charleston plant. These stacks have six rolls and the housings are high enough for two additional rolls. Electric lift is operated from the floor. Water cooled bearings are lubricated by a gravity feed oiling system. The view at the right shows the two Calenders installed in the Westvaco plant.



Westvaco will keep its calender rolls in condition by regrinding them in a 36″ x 292″ Farrel Roll Grinder similar to the one illustrated above. Farrel Roll Grinders are especially designed for grinding the long rolls used in paper mills and to attain maximum production with uniform and close limits of accuracy and a superior quality of finish.

# FARREL CALENDERS *and* ROLL GRINDER *at* WESTVACO

**The new kraft mill of the West Virginia Pulp & Paper Company at Charleston, S. C., represents the last word in paper mill design for high speed, low cost operation in the production of kraft paper.**

**Farrel-Birmingham Company, Inc., is proud to have had a part in equipping this modern mill by supplying the two 234″ Machine Calender Stacks and a 36″ x 292″ Roll Grinding Machine. In keeping with the modern design and construction of the entire mill and its equipment, the Farrel units embody the latest mechanical improvements and the highest grade materials and workmanship.**

**Farrel Calender Rolls are noted for the uniform depth and hardness of their chilled body surface, the correct shape and amount of crown, and the accuracy and smooth finish of both bodies and journals . . . important factors in the production of uniform quality paper.**

**These qualities are inherent in all Farrel Rolls and account for the wide preference accorded them by the paper industry. For every paper mill application they assure maximum performance, economy and long life.**

**FARREL - BIRMINGHAM COMPANY, INC., ANSONIA, CONN.**

# Westvaco

The world's largest manufacturer of high grade printing papers. The high quality papers manufactured by the WEST VIRGINIA PULP & PAPER COMPANY are well known for their exceptional printing qualities.

In addition to machine finish and super-calendered papers Westvaco manufactures coated paper, kraft paper, liner board and fibre board. With the completion of the new Charleston, S. C. plant, the six Westvaco plants will have a capacity of over 1,500 tons of paper and board per day.

Westvaco also manufactures a variety of by-products such as activated carbon, chalk, liquid chlorine, caustic, turpentine, alcohol and fatty acids.

**RILEY STEAM GENERATING UNIT**

W. Va. Pulp & Paper Co. · Covington, Va.

1—375,000 lbs.—600 lbs. Press. 750° F. Steam

WESTVACO
WEST VIRGINIA
PULP & PAPER
COMPANY
QUALITY

Since this advertisement was run in April 1937, W. Va. Pulp & Paper Co. have ordered duplicate Steam Generating Units for Luke, Md. and Covington, Va.

# ~~12~~ 14 has placed orders with RILEY in 9 years

## A Record that tells a story of the satisfactory performance of Riley Equipment

2-X—375,000 lbs./hr. Unit for Covington, Va.
2-X—375,000 lbs./hr. Unit for Luke, Md.
2— 71,500 lbs./hr. Units for Williamsburg, Pa.
2—225,000 lbs./hr. Units for Charleston, S. C.

*Westvaco has placed the following orders with Riley*

LUKE, MD.

| | |
|---|---|
| Nov. 17, 1927 | 2—No. 4 Pulverizers and Burners |
| May 15, 1928 | 4—No. 4 Pulverizers and Burners |
| Nov. 1, 1928 | 4—No. 4 Pulverizers and Burners |
| Dec. 20, 1929 | 2—No. 4 Duplex Pulverizers and Burners |
| Dec. 2, 1933 | 1—375,000 lbs./hr. Steam Generating Unit |
| | 3—No. 4 Duplex Pulverizers and Burners |

April 9, 1937 1—375,000 lbs./hr. Steam Generating Unit

COVINGTON, VA.

| | |
|---|---|
| Jan. 15, 1929 | 1—No. 4 Pulverizer |
| Nov. 9, 1933 | 1—375,000 lbs./hr. Steam Generating Unit |
| | 3—No. 4 Pulverizers and Burners |
| April 16, 1936 | 2—No. 4 Pulverizers |

May 28, 1937 1—375,000 lbs./hr. Steam Generating Unit

TYRONE, PA.

| | |
|---|---|
| April 24, 1929 | 5—No. 4 Pulverizers and Burners |
| June 25, 1936 | Water Walls for existing boilers |

WILLIAMSBURG, PA.

| | |
|---|---|
| Feb. 3, 1936 | 2—71,500 lbs./hr. Steam Generating Units |
| | 3—No. 4 Pulverizers and Burners |

CHARLESTON, S. C.

| | |
|---|---|
| June 30, 1936 | 2—225,000 lbs./hr. Steam Generating Units |
| | 4—No. 5 Pulverizers and Burners |

Complete satisfaction from previous installations is the sole basis for placing repeat ~~twelve different~~ fourteen orders. The fact that West Virginia Pulp & Paper Company has placed orders with Riley in nine years, thoroughly indicates that Riley Stoker Corporation and Riley equipment has entirely fulfilled West Virginia Pulp & Paper Company's expectations as to performance, service and handling of previous orders.

It is because of the satisfactory performance of Riley Steam Generating Equipment, that there has been such a decided swing to Riley . . . why Riley sales in 1936 far exceeded all previous sales records. Riley's star is definitely in the ascendency. A visit to a number of Riley installations will clearly give you the reasons why.

The performance of recent Riley installations assures you the same type of satisfactory installation when you order Riley equipment. When considering steam generating or fuel burning equipment be sure to call on Riley.

# RILEY

STOKER CORPORATION - WORCESTER, MASSACHUSETTS

BOSTON NEW YORK PHILADELPHIA PITTSBURGH BUFFALO CLEVELAND DETROIT TACOMA BALTIMORE
ST. LOUIS CINCINNATI HOUSTON CHICAGO ST. PAUL KANSAS CITY LOS ANGELES ATLANTA

COMPLETE STEAM GENERATING UNITS

BOILERS - SUPERHEATERS - AIR HEATERS - ECONOMIZERS - PULVERIZERS
BURNERS - STOKERS - WATER-COOLED FURNACES - STEEL CLAD SETTINGS

The grinder is equipped with a cam type crowning device and the grinding wheels operate on the swing rest principle, for the accurate grinding of long slender rolls such as used in paper calenders. The carriage ways are inverted, V type, flood lubricated and covered by a flexible metal guard to exclude dirt and grit from the ways. Another refinement is that the screw driven carriage is also fully enclosed and runs in a bath of oil, being driven by the variable speed direct current motor through a worm gear assemblage.

The Bridgeport Safety Emery Wheel Company supplied a 100-inch motor driven knife grinder equipped with a 26-inch sectional grinding wheel for sharpening the chipper knives. This equipment is of rigid, heavy construction, with an especially substantial revolving knife bar.

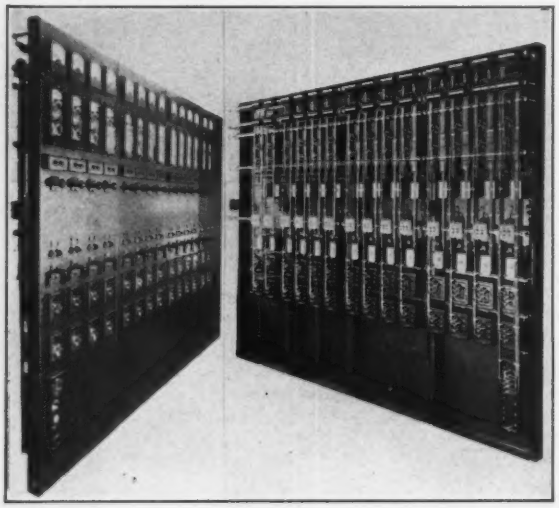
### Cameron Machine Co.

The 234-inch, trim, 238-inch drum face winder, capable of rewinding rolls to 60 inches in diameter, is the product of the Cameron Machine Company. This machine can be run at speeds up to 3,300 feet per minute and its slitter units can be set to widths of 5½ inches up. It incorporates automatic counterweighting of the riding roller and rewind shaft, so assuring rolls of even density from the core out.

The distinctive winder drum grooves perform a double function—the automatic separation of the slit sections of the stock as it is wound into rolls and the elimination of slack edges on the web, which otherwise would be productive of occasional wrinkles. Provisions are also made for reversing the sheet, winding wire side in or out, as may be required, while all rolls are balanced both statically and dynamically to run quietly at top speed.

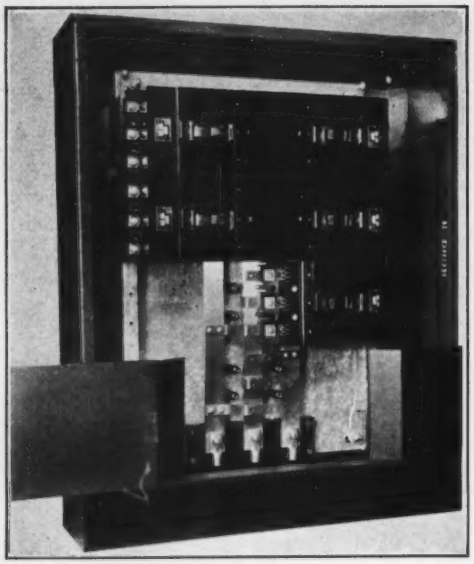
### Riley Stoker Corp.—Combustion Engineering Co.—The Babcock & Wilcox Co.

The three sources of steam at the Charleston plant —power boilers, recovery units and bark burner— generate steam at 600 lbs. per square inch and in each case the steam is superheated to a temperature of 700 to 750 deg.



*Courtesy of The Wolfe & Mann Mfg. Co.*

FRONT AND REAR VIEWS OF FEEDER CIRCUIT PANELS FOR A. C. GENERATORS AND FEEDER CIRCUITS IN POWER HOUSE.



*Courtesy of I. T. E. Circuit Breaker Co.*

TYPICAL SECTION OF ONE OF THE MANY CONVERTIBLE POWER PANELS.

The power boilers supplied by Riley Stoker Corporation deliver 225,000 lbs. of steam each at 750 degs. and can be fired on either pulverized coal or oil fuel. The boiler furnaces are water-cooled on three sides, with a refractory floor, and are equipped with four burners arranged in pairs toed-in. The boilers are provided with superheaters, air preheaters and flue gas scrubbers.

The recovery units, three Murry-Waern units provided by the Combustion Engineering Company and one Tomlinson by the Babcock & Wilcox Company, have 3-drum waste heat boilers, are of substantially the same capacity—52,000 lbs. of steam per hour when handling 27,000 lbs. of black liquor concentrated to 55 per cent solids—and are provided with superheaters, scrubbers, soot blowers, metering and control equipment.

The bark burning unit, which can also be fired on oil, is provided by The Babcock & Wilcox Company. It is an integral-furnace boiler unit, complete with loop-tube superheater, air heater, forced draft steam-mechanical-atomizing oil burners. The boiler has 7,293 square feet of heating surface and a maximum capacity of 48,000 lbs. of steam per hour with bark fuel. Forced and induced draft fans are provided with motor drives, and combustion control and the unit is equipped with a bark burning extension furnace of three compartments.

### Harbison-Walker Refractories Co.

The recovery units supplied by the Combustion Engineering company are provided with hard burned chrome brick by the Harbison-Walker Refractories Company and this concern also supplied the chrome base, high temperature bonding mortar used for the rotary driers in the smelter furnaces of these same units.

For the lime kilns, Harbison-Walker high-heat duty fire-clay brick were used and also some 70 per cent alumina brick. In the waste heat boilers, the selections were both high-heat-duty and intermediate-heat-duty fireclay brick. Fireclay brick were also

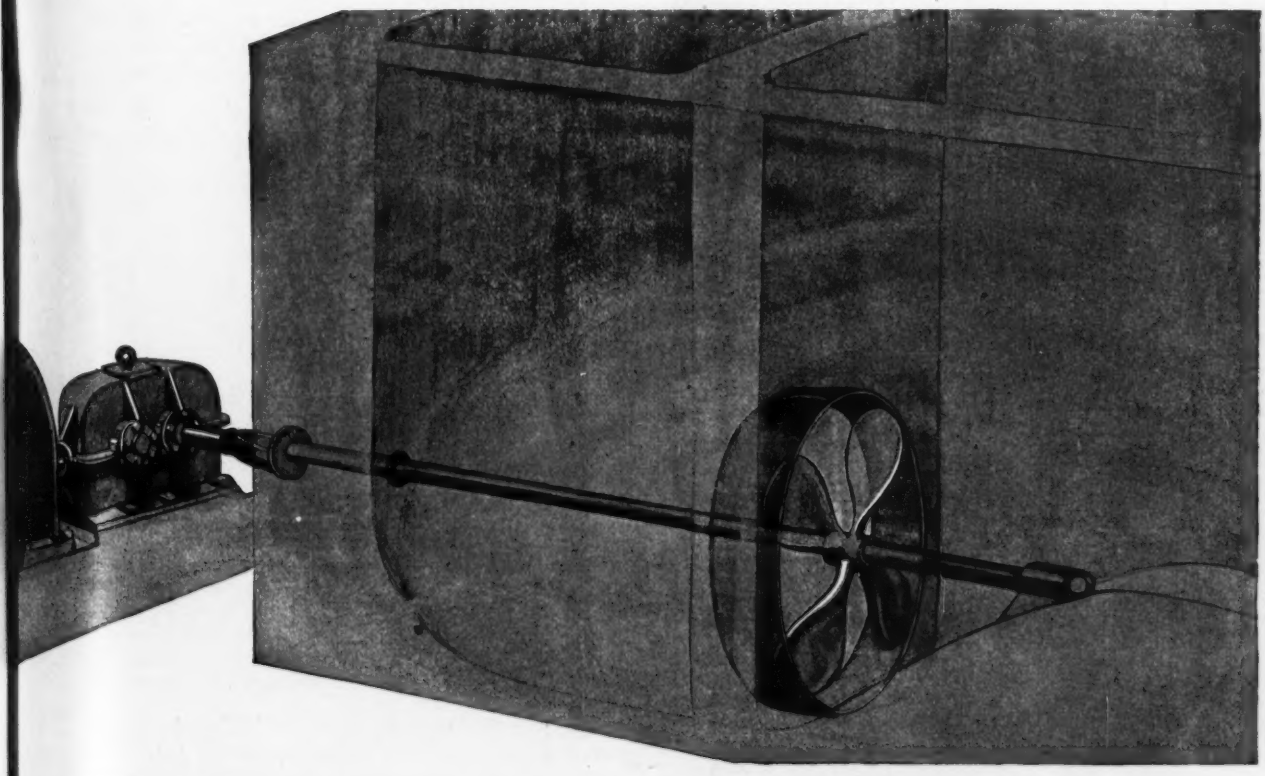
# a *Modern Mill*
# Paper Company—Charleston, S. C.

# PERFECT AGITATION

**Noble & Wood Propeller Agitators installed in all Beater and Machine Chests where thorough and uniform agitation is most important.**

When in need of efficient agitation, whether for replacement of existing equipment or for new installations, investigate Noble & Wood Propellers. They can be applied to most any type of chest. Two hundred and fifty operating units installed without failure. That tells the story in itself.

ASK us for recommendations without obligation to you.



## NOBLE & WOOD MACHINE CO.

**HOOSICK FALLS, N. Y.**

employed for the power boilers and for the bark burning unit.

The Philip Carey Company furnished the insulation material for the recovery units and high temperature and magnesia covering for all superheated steam lines. Carey magnesia coverings were also used on all steam, exhaust, hot water and hot oil lines and Carey magnesia blocks and cements to protect the evaporator equipment.

### B. F. Sturtevant Co.—Clarage Fan Co.

A forced draft fan of the B. F. Sturtevant Company is delivering 30m400 cubic feet of air per minute against 14-inch static pressure, taking 100 hp. at 1,150 r.p.m. at the new West Virginia kraft mill and a Sturtevant induced draft fan, 67,000 cubic feet per minute at 400 degs. against 12.5-inch static pressure, using 197 hp. at 1,150 r.p.m.

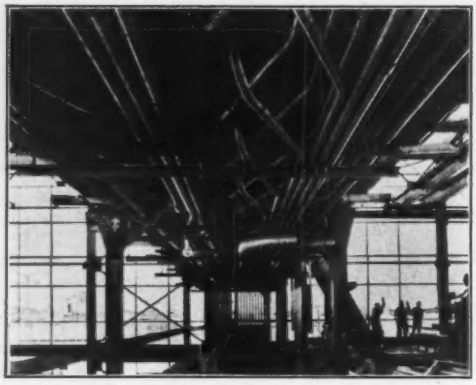
The Clarage Fan Company has two induced fans delivering 50,000 cubic feet of air per minute against 3-inch static pressure, taking about 40-hp. at 340 r.p.m. and 330-deg., down at Charleston.

A large number of small valves were furnished the Charleston plant by Reading-Pratt & Cady Division of American Chain and Cable Company, Inc. The 5,000 power line cable feeders and a large quantity of rubber sheathed portable cables for service on portable tools and equipment were provided by the Okonite Company. The main control switchboard for the alternating current generators and the feeder circuits in the power house were ordered from the Wolfe & Mann Manufacturing Company. Eighteen lighting and thirty-two power panels were furnished by the I.T.E. Circuit Breaker Company. Many seamless fittings welded into the extensive piping at Charleston came from Tube Turns, Incorporated and much conduit for light and power lines from the Clifton Conduit Company.

### General Electric Co.

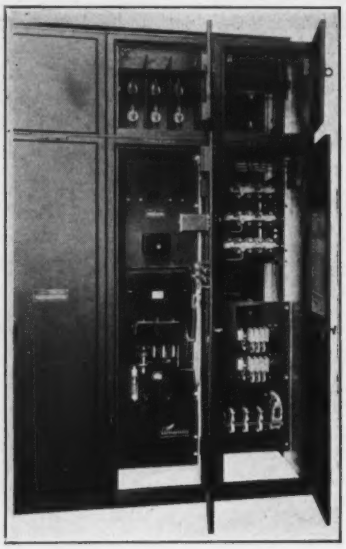
Among the more interesting of General Electric equipment installed at Charleston are transformers ranging in sizes from 5 to 250 kva., totaling in the aggregate to close to 6,000 kva. These were installed because they did not require the expensive vaults commonly needed to house transformers of these sizes.

Another interesting installation is the ninety con-



*Courtesy of Clifton Conduit Co.*

LARGE SIZES OF GALVANIZED, MILD-STEEL CONDUIT BRANCH OFF IN ALL DIRECTIONS CARRYING POWER CABLES AND DISTRIBUTION LINES THROUGH MANY CURVES AND SMOOTH ELBOWS.



*Courtesy of General Electric Co.*

ENCLOSED MAGNETIC A-C MOTOR CONTROLLER WITH OVERHEAD BUS AND DISCONNECTING SWITCHES.

trol cubicles furnished by the General Electric Company to handle all the motors which operate on 2,300 volts and act as feeders for the various transformer banks. This type of construction is relatively new, but has already proved a desirable means of securing high voltage control. Each starter is in an individual compartment encased in steel and each starter has over it its individual disconnecting switch which is so interlocked with the main mechanism that the switch cannot be opened under load, but will first trip the oil circuit breaker in the starting compartment below.

Most of the general purpose motors are also of General Electric manufacture, as well as two 300-hp. chipper motors furnished with splash proof construction.

### Chicago Bridge & Iron Co.

Important tanks used in connection with the pulp making process at Charleston were fabricated by the Chicago Bridge and Iron Company—specifically:

2 — 20-in. dia. by 35-ft. high Coagulation tanks
1 — 12-in. dia. by 29-ft. high Filter tank
2 — 12-in. dia. by 24½ ft. high Filter tanks
1 — 54-in. dia. by 16¾ ft. high Steel shell

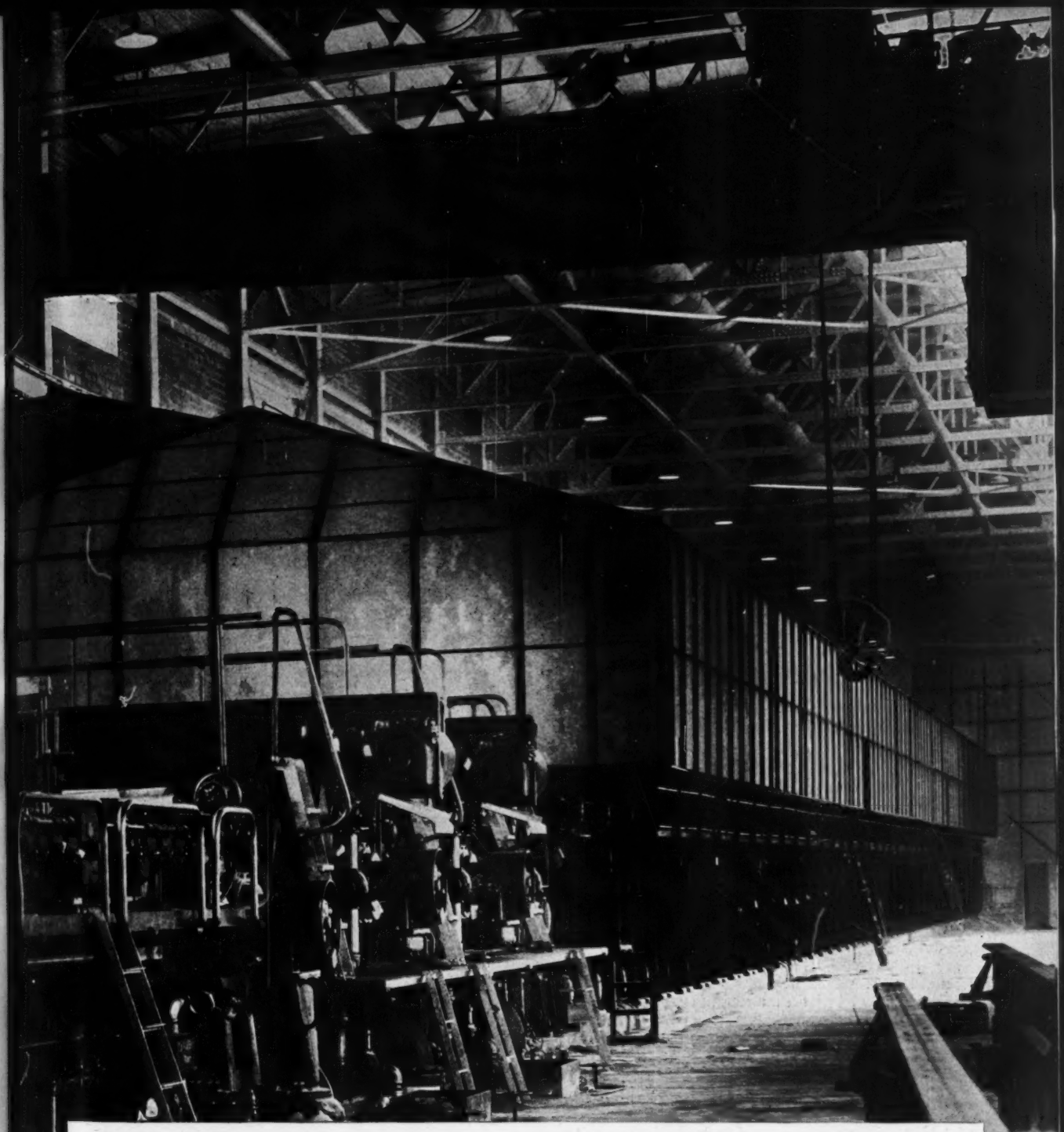
### Foster Wheeler Corp.

The unusual and distinctive blow-off condenser, capable of handling all steam flashed from the content of the 11-ton sulphate digesters, was provided by Foster-Wheeler Corporation and is noteworthy, especially as it is quite new to the paper making industry. The red wood heating sections, peculiar to the unit, are inexpensive, can be readily replaced and last for several years.

In connection with the caustic plant and for the screen room, some interesting equipment was likewise supplied, exemplifying the general excellence of the Charleston plant equipment.

### Improved Paper Machinery Corp.

The Improved Paper Machinery Corporation furnished an 8 x 8 feet rotary lime sludge filter, equipped



West Virginia Pulp and Paper Company, Charleston, South Carolina. 240" Fourdrinier Kraft Liner

*"ask us"*

**THE PUSEY AND JONES CORPORATION**

**Established 1848. Builders of Paper-making Machinery, Wilmington, Del.**

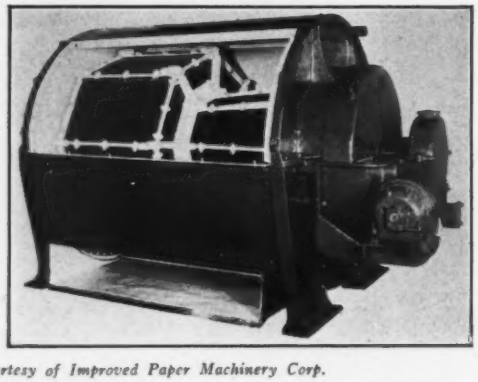
with washing showers, in place of the customary tank, for the final stage of lime sludge washing. The cake from this filter is discharged into an agitator chamber from which it can be sent to either of two 8 x 6 feet sludge filters supplied by the same equipment manufacturer, both of which are arranged to deliver to the single rotary kiln. There is a conveyor system under the sludge filters which takes care of the introduction of oyster shells for make-up lime.

All of the sludge filters are equipped with 24 x 110 inches corduroy faces and the construction under the face is such that no undercovers are required. The swing agitators in the vat for preventing the precipitation of the sludge are independently driven through separate gear motors and each of the filters is provided with a variable speed drive, while the vacuum for all three filters is created by a single vacuum pump.

The four knotters, six centrifugal screens, and two high density thickeners in the screen room were also furnished by the Improved Paper Machinery Corporation, as well as the 120 inches, 3-roll hydraulic wet machine located in a building close to the wharf. The part played by these units is best demonstrated by a brief outline of the functions they discharge in the screen room processes.

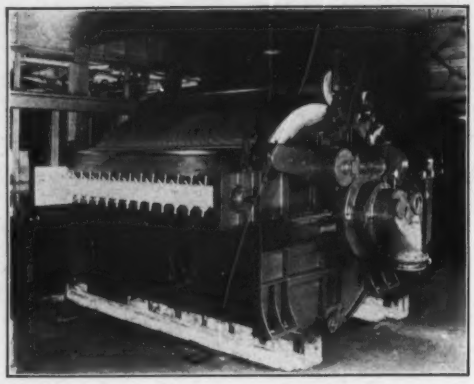
At the top of the screen room are two dilution boxes to which the stock is pumped and overflows from one compartment at a constant level. This flow of stock is controlled by a butterfly-valve and the dilution water is introduced into a compartment equipped with a propeller type mixer. The stock discharged from both of the dilution boxes runs into a large flume above the knotters and under usual operation there is a dam at the center of the flume which divides the flow to the two banks of equipment installed. Each of these banks has a capacity of 200 tons production per day and in each two of the four knotters equipped with integral worm drives are installed. These knotters are equipped with plates having ½-inch perforations and have shown a capacity on southern kraft of over 140 tons per unit. Each knotter is driven by a splash-proof motor.

The stock discharged from the knotters passes into a flume which supplies screens, driven by individual motors through V-belts, located directly under the knotters. A series of tests made on one of these screens showed that a maximum tonnage of over 139 tons per day was obtainable at a power consumption of less than 0.36-hp. per ton. Further tests showed



*Courtesy of Improved Paper Machinery Corp.*

KNOTTERS, WITH INTEGRAL WORM DRIVES AND EQUIPPED WITH PLATES HAVING ½ INCH PERFORATIONS, HAVE SHOWN A CAPACITY OF OVER 140 TONS PER UNIT ON SOUTHERN KRAFT.



*Courtesy of Improved Paper Machinery Corp.*

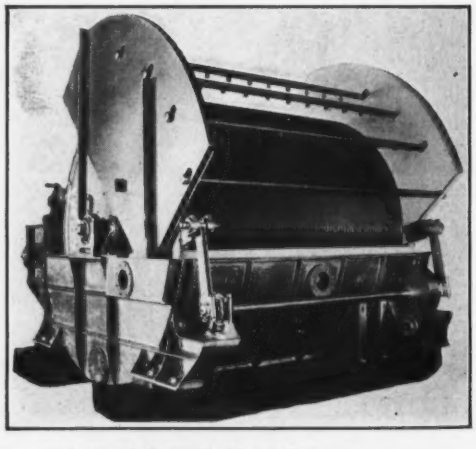
FROM THE SCREENS, THE ACCEPTED STOCK COLLECTED IN STORAGE TANKS IS PUMPED TO TWO HIGH-DENSITY VACUUM THICKENERS, WHICH DISCHARGE PULP AT A CONSISTENCY UP TO 25 PER CENT A. D.

that the screen could be operated with stock entering the screen at a consistency as high as 1.25 per cent A.D.

There are no secondary screens and the rejects drop into a horizontal trough and are sluiced to the thickener for dewatering before going to a storage tank, from which the rejects are subsequently pumped to a refining system and turned back to the stock chest for rescreening.

From the screens, the accepted stock drops to two large storage tanks on the ground floor, from which it is pumped to two high density vacuum thickeners. These latter machines serve two purposes—as deckers after the screens and as high density thickeners discharging the pulp at consistencies up to 25 per cent A.D. Each of these thickeners has a tested capacity of over 250 tons.

The thickeners are equipped with special shredders for dividing the pulp into extra fine particles and this pulp drops into a reversible screw conveyor by which the stock may be run to a low consistency (3½ per cent) storage chest on the ground floor or to six high consistency elevated storage tanks. The return water from the high density thickeners goes to a



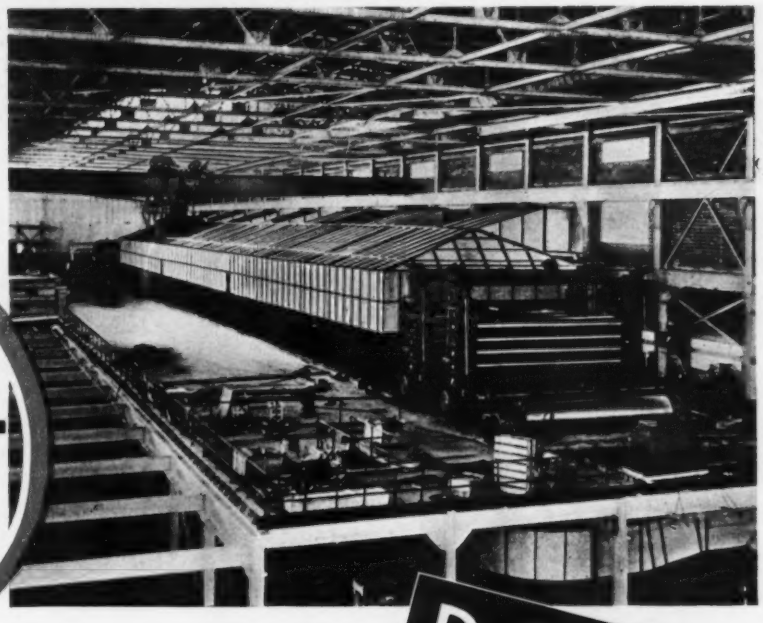
*Courtesy of Improved Paper Machinery Corp.*

LIME SLUDGE FILTER, FURNISHED WITH SHOWERS AND AGITATOR FOR MIXING SLUDGE WITH WATER TO SUPPLY THE TWO SMALLER FILTERS, SHOWING CORRUGATED FACE.

West Virginia Pulp & Paper Co. Mill at Charleston, S. Carolina



View of the huge machine in the new West Virginia Pulp and Paper Co. Mill—Charleston, S. C.



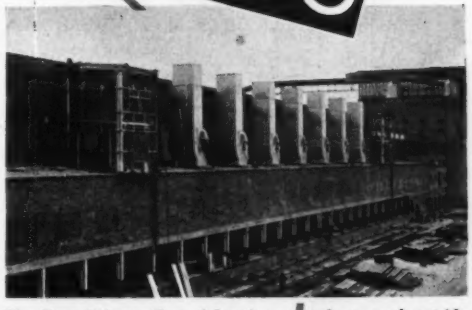
# The World's LONGEST MACHINE

## is equipped with the world's longest hood

ROSS Removable Panel HOODS

**This mill is indicative of the growth and development of the paper industry, and to assure unqualified results the equipment is the best that modern engineering can produce. The huge machine is covered with a Ross Hood that measures 252 ft. from end to end, constructed to afford quick access to dryers along the entire length of the machine with constant protection against damage from vapor, corrosion or warping. Other Ross equipment is used to introduce large quantities of air into the Mill, a portion being distributed over the roof to prevent condensation, the balance supplied to bottom felt of the machine to assist in the drying.**

We are justly proud of the selection of Ross Systems by the West Virginia Pulp & Paper Co. for this new Mill that marks a new "high" in the science of paper making.



The Ross Exhaust Fans (above) mounted on roof outside of the Machine room are actually 36 ft. apart. This view again emphasizes the exceptional size and length of this huge machine and Ross Hood.

J. O. ROSS ENGINEERING CORPORATION

*Main Office* — 350 MADISON AVE., NEW YORK, N. Y.

201 North Wells St. CHICAGO

12953 Greeley Ave. DETROIT

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chest on the ground floor and is subsequently used for stock dilution. By locating the high density thickeners at a fairly high elevation, the water flows by gravity into this tank, with sufficient drop also available for the barometric legs.

The 120 inches, 3-roll hydraulic wet machine located in a building close to the wharf and a railroad siding is rated at 100 tons of pulp at 50 per cent A.D. The pulp sheet is formed on a 5 feet vacuum cylinder by which it is pressed by three rolls to about 28 per cent consistency and is then carried on a felt to a second, individually driven press, the transfer of sheet from one felt to the next being automatic.

From the second press, the sheet goes to the 3-roll hydraulic press, designed for pressure up to 1,000 lbs. per lineal inch of press roll face, and is delivered at 50 per cent A.D. consistency. This main press has two 18-inch bottom rolls and a top roll 28 inches in diameter. This top roll is forced into the nip between the two bottom rolls by two hydraulic cylinders, an arrangement which gives close control of the pressure applied and also provides an easy means of raising the top press when the felt is changed or when the machine is shut down. From this press, the sheet passes to a rotary cutter driven separately though a variable pitch sheave, so that sheets of different length can be cut.

The drive for the wet machine is from a single motor with a totally enclosed reduction gear for driving main 3-roll press. The intermediate press and the vacuum end are driven through variable speed transmissions, so as to provide the necessary adjustment for the draw.

### The Dorr Co., Inc.

The batch causticizing system at the Charleston plant is housed in three buildings, the operation between which is knitted together, briefly as follows:

In the causticizing building, the reburnt lime from two 8 feet 6 inches, oil fired, kilns 170 feet in length drops directly into two 8 feet x 5 feet mixing tanks, each of which is connected to a 400 gallons per minute centrifugal pump for circulating the milk of lime into the classifier and thence into either of the two causticizers. On starting a batch, each tank is filled with clear green liquor and the milk of lime is then pumped from each mixing tank into the classifier above the causticizer, the bowl overflow entering the batch tank being causticized. The batch tank has a return line to the slaker, or mixing tank, so the material is constantly circulated until the alkali has reached the desired strength. When this occurs, the circulation of the milk of lime is changed, thus starting the next batch. While the second batch is causticized, the first batch is pumped to the liquor settling room and the emptied tank is refilled with green liquor.

The sand rejects from the bowl classifier drop into a chute leading to a steel hopper outside the building. From this receptacle they are removed by truck to the dumping grounds.

New lime is at present added to the system either in the form of unslaked lime from a bin outside the kiln discharge room or in the shape of washed oyster shells at the feed end of the kiln. Eventually, it is planned to use only the oyster shell supply.

The completed batch is moved from the causticizing building by an 800 gallons per minute pump feeding directly to a white liquor feed, or balance tank in the liquor clarification building. This tank has a capacity of 70,000 gallons and is provided with a paddle agitator to prevent the lime mud from settling. A centrifugal pump moves the slurry from this tank to either or both of two 2-compartment white liquor clarifiers of 110,000 gallons capacity. The mud raked to the center is moved by a suction pump to a 35,000 gallon sludge also equipped with a paddle agitator to prevent the lime mud from settling, while the white liquor overflow moves by gravity to one of the three 150,000 gallons white liquor storage tanks outside the building.

The raw green liquor coming from the dissolving tanks at the recovery boilers is passed through a trommel screen to a large storage tank outside the building, from which it is pumped to the 2-compartment green liquor clarifier, thence passes by gravity to a large green liquor storage tank also outside the causticizing building. The green liquor overflow, removed from the bottom of the tank by one of a series of suction pumps, delivers to a washer.

This dregs washer is a single tank with four compartments, in which a counter-current washing action takes place, washing the dregs clean, the overflow from which operation is sent to a separate storage tank and is used for diluting the smelt in the dissolving tanks at the recovery furnaces. The washed dregs are removed by a suction pump and discharged into a waste tank outside the building.

On the top floor or the third, or filter building are three filters, the primary unit handling the lime sludge pumped from the lime mud tank in the other building. This filter cake, after being subjected to a series of washing sprays, is repulped and with water added is split between the two filters at the feed end of each kiln. At this point, the mud is again washed and dropped into a helical screw conveyor to which the washed oyster shells are also fed, so that the washed lime and shells enter the kiln together. The temperature at the end of the kiln at which this mixture is added is around 900 degrees, as compared to 2,500 degrees at the discharge end of the kiln.

The filtrate from the three filters is trapped in the vacuum receiver and pumped to the weak liquor storage tank, together with the dregs washer overflow. The soda content of this filtrate depends largely upon the amount of wash water dilution.

### Instrumentation

Instrumentation and the applications of automatic regulating devices has been carried to considerable length at the Charleston plant, as exemplified by the brief reference made to the system of combustion control provided. This system was developed and installed by the Republic Flow Meters Company, which concern also provided the boiler meter panels and instruments, that for the bark burning steamer, instruments for the recovery boilers, the turbine and desuperheating instruments and the instruments on the panel where all process steam, condensate and feedwater flows are recorded and integrated.

The safety valves and high-pressure steam gauges were furnished by Consolidated Ashcroft-Hancock Company, while the recording and controlling instruments provided by the Foxboro Company include 2-pen recording thermometers for each of the five sulphate digesters in the pulp mill, a pressure recorder and a non-recording temperature controller for regulating the amount of water flowing through the condenser.

The wash pan recording thermometers were also

provided by the Foxboro Company, as well as a recording pressure gauge in the black liquor line to the filter where the last traces of pulp are removed from the liquor before it passes to the evaporators. Two dual temperature controllers for regulating the heating of a caustic soda liquor were provided by this instrument builder and several vacuum gauges, a recording pressure gauge and a recording thermometer for paper machine applications.

Other instruments of Foxboro make at Charleston include a liquid level controller on the hot water storage tank, a pressure recorder on the plant steam header, an instrument board which carries four indicating thermometers posting the temperature conditions on the air compressor after the cooler and a 6-point potentiometer pyrometer. The latter instrument is for recording the lime kiln temperatures.

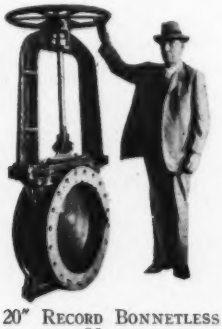
Numerous other instruments and regulators are in service at the new southern pulp and paper mill, the simple listing of which might possibly convey some idea of the extensive and important role played by instrumentation in this latest addition to the mills of the West Virginia Pulp and Paper Company, but equally convincing would seem to be the opinion expressed by an engineer of the Weston Electric Instrument Company, the concern which provided the electrical testing instruments for the Charleston plant.

In substance, this was to the effect that the comprehensive complement of testing instruments selected by West Virginia was of highest laboratory quality and precision, of a grade rarely purchased by an industrial organization for its own use.

### Record Foundry & Machine Co.

One of the most important of the process requirements of a new modern pulp and paper producing plant are the various stock distributing systems. These systems are most carefully engineered and appropri-

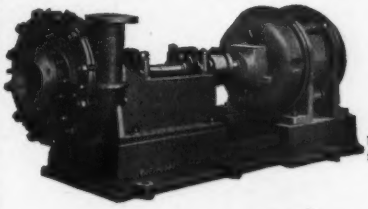
24" Record Improved Valve



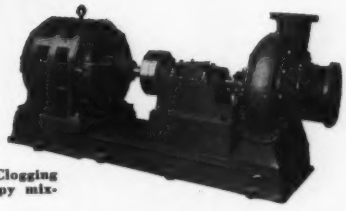
20" Record Bonnetless Valve

ate type and kinds of metals specified for piping, fittings and valves. For their stock valve requirements several hundred Record Specialized "Improved" and "Bonnetless" gate valves were selected by reason of the experience gained through many years as users of Record valves. Illustrated is a 24 inch "Improved" valve provided with bonnet and bottom cleanouts and also a 24 inch "Bonnetless" valve with bottom cleanout only. These valves were rising screw stem or rack operated—metals of iron or I.B.B.M. and with or without "Renewable Seats."


## Why "West Virginia" uses hundreds of MORRIS Centrifugal Pumps



Morris Slurry Pump for abrasive mixtures



Morris Non-Clogging Pump for pulpy mixtures

"WEST VIRGINIA" knows the many advantageous features of Morris Centrifugal Pumps from personal and extensive experience with them. The many Morris Pumps which have been installed in "West Virginia" plants at Tyrone, Covington, Williamsburg and Mechanicsville have fully demonstrated their excellence of design and construction. The new bleach plant at Luke, Md., is completely equipped with Morris Centrifugal Pumps, and now, Morris Pumps are widely used in the latest "West Virginia" mill at Charleston, S. C.

One reason why "West Virginia" and so many other pulp and paper companies have confidence in Morris Pumps is that each Morris Pump type is specially designed for an individual service—for thick or thin stock, clear or white water, chemicals, or for each general plant duty. Another reason for the wide preference for Morris Pumps is that each type has conclusively proven its long-maintained high efficiency and its reliable trouble-free performance. For special services Morris Pumps may be made rubber-lined or of any desired alloy.

Morris Centrifugal Pumps for paper and pulp mill duties are fully described in Bulletin 148, which will be sent on request.

**MORRIS MACHINE WORKS**

**Baldwinsville, N. Y.**

**"Serving the Paper and Pulp Industry for Over 70 Years"**

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Toys

## SULPHATE KRAFT PULP

# Coast Paper Companies File Stock Issues

## Grays Harbor Pulp & Paper Co., Rainier Pulp & Paper Co., and Olympic Forest Products Co. Make Registration Statement Under Securities Act of 1933 — Have Principal Offices at 343 Sansome St., San Francisco.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 4, 1937—Grays Harbor Pulp and Paper Company, Rainier Pulp and Paper Company and Olympic Forest Products Company, all giving their principal offices at 343 Sansome street, San Francisco, California, have filed registration statements with the Federal Securities and Exchange Commission under the Securities Act of 1933. Edward M. Mills, of San Francisco, is president of all three companies.

According to the registration statements "the pulp companies are all engaged in producing to a substantial extent bleached sulphite pulps by processes developed by Rainier Pulp and Paper Company, and practically all the pulps so produced are sold by and in the name of the Rainier Pulp and Paper Company, the other two companies participating in the returns from such sales in accordance with the terms of their respective contracts with Rainier Pulp & Paper Company. The pulp companies are not nor are any two of them under common control either directly or indirectly," it is stated, "nor do any of them or any two of them control another. No one of them owns any stock of any other except that Rainier Pulp and Paper Company is the beneficial owner of 2,815 shares (2.99 per cent of the total) of the common stock of Olympic Forest Products Company."

The companies further state that "various persons including the principal executive officers and certain directors act in similar capacities for each of the companies," and that "no majority of the Board of Directors of any one of the three pulp companies is identical with a majority of the Board of Directors of either of the other two pulp companies."

### Grays Harbor Registration

Grays Harbor Pulp Company is registering 244,662 shares of $25 par value $2 cumulative preferred stock and 244,662 shares of $1 par value common stock to be reserved for conversion of the preferred. The preferred stock is being offered to common stock holders but the stockholders are asked by the company to waive their preemptive rights so that 151,970 shares may be offered in exchange for 33,771 outstanding shares of the company's $8 preferred stock on the basis of 4½ shares for each share of $8 preferred. The company states that it has been advised that holders of at least 17,368 shares of $8 preferred stock will hold that stock until preferred dividends have been paid and such stock has been purchased or redeemed. The shares not taken under the exchange offer together with the remaining 92,692 shares will be offered first to the common stockholders at $36 a share and any of these shares not taken by the stockholders are to be offered publicly through underwriters.

Of the cash proceeds to be received by the company, $3,099,970 will be used to redeem at 103 per cent of the principal amount and accrued interest on October 1, 1937, and January 1, 1938, respectively, $1,964,500 principal amount of First Mortgage 6 per cent Gold Bonds Series 1943 and $964,000 principal amount of First Mortgage 6 per cent Gold Bonds Series 1944. To the extent holders of the $8 preferred stock do not accept the offer of exchange, a portion of the cash proceeds will be used to provide funds to pay accrued dividends on the unexchanged shares or to purchase such shares for retirement. The balance of the cash proceeds will be used to reimburse the treasury of the company for improvement of its property and plant and to provide working capital.

### Rainier Registration

Rainier Pulp and Paper Company has registered 49,600 shares of $10 par value capital stock to be offered at $50 a share to stockholders of record August 20, 1937, in a ratio of one new share for each five shares held. Transferable Warrants evidencing such subscription rights but exercisable only in amounts calling for full shares and expiring on the close of business on the 14th day after the record date will be issued to stockholders. Any of the shares not taken by stockholders will be offered publicly through underwriters.

The proceeds are to be used as follows:

To reedem all existing bank indebtedness, other than current, on delivery date of the unsubscribed stock, estimated to be $1,250,000.

$600,000 will be used to reimburse the treasury of the company for subscription in the amount of $100,000, to the capital stock of Fernandina Pulp and Paper Company, a wholly owned subsidiary and for advances to that company already made and for advances planned to be made in the near future, estimated at $500,000.

The balance of the proceeds will be used to reimburse the treasury of the company for improvement of its property and plant and to provide working capital.

### Olympic Forest Products Registration

Olympic Forest Products Company has registered 159,998 shares of $25 par value $2 cumulative preferred stock and $225,876 shares of $1 par value common stock. The preferred stock and 19,999 shares of common stock are to be offered in exchange for 39,997 shares of the company's $8 preferred stock on the basis of four shares of the new preferred and one-half share of common for each share of the old preferred. The company will offer 20,823 shares of the common stock to its common stockholders at $30 a share and will also offer to such stockholders the number of shares of common stock as may be necessary to provide funds to pay dividends on and to purchase for retirement the shares of $8 preferred stock not exchanged under the exchange offer. Any of the shares being offered to common stockholders and not taken by them will be offered through underwriters.

Of the cash proceeds to be received by the com-

pany, $585,997.50 will be used to redeem on October 1, 1937, at 101 per cent accrued interest, $574,000 principal of serial Debentures. Part of the cash proceeds will be used to provide funds for the payment of dividends on and to purchase for retirement the unexchanged $8 preferred stock. The balance of the proceeds will be used to reimburse the treasury of the company for improvements to its property and plant and to provide working capital.

Blyth & Co., Inc., of San Francisco, will underwrite all of the issues.

## Join Butler Paper Co. at Tulsa

TULSA, Okla., August 1, 1937—The rapid increase in volume of business which compelled the Butler Paper Company to move the first of June into a new and spacious location, at the northwest corner of Boston and Cameron, also demanded additions to the personnel. One of the new men who joined the company at that time is Don Mershon who buys all mill orders, handles special inquiries and occupies one of the most important posts in the organization.

Mershon has a background that is unusual for so young a man. His father, W. R. Mershon, was manager of the Milwaukee branch of the Butler Paper Company for 15 years and was for many years associated with the Butler Paper Company in Chicago and Milwaukee, so that the younger Mershon has grown up in the tradition of this company. He is a graduate of the University of Wisconsin, class of 1932. He spent a year with the Butler Paper Company in Milwaukee and a year and a half in the research department of the company in Chicago. He went from Chicago to the Detroit branch of the Butler Paper Company and came from a desk in that office to Tulsa.

Other members of the sales staff of the Butler Paper Company are Harry Thompson, John Walsh, John Culley and Harold McJilton. These men, in addition to E. J. Lawyer, vice-president and general manager of the company who handles many customers' orders personally, make up the sales staff.

Harry Thompson who has the city sales desk in the offices of the firm, has been associated with various printing firms in Tulsa since 1920. He was with the stationery department of the Ohio Oil Company for 10½ years and is widely known in Tulsa and the Tulsa territory.

John Walsh, city salesman, was associated with printing concerns for several years prior to his affiliation with the Missouri Interstate Printing Company. He has been with the Butler Paper Company since the organization of the firm a year and a half ago.

John Culley who also handles the city trade, has also been associated with the printing industry over a period of several years and is widely known in this territory.

The orders in the country are handled by Harold McJilton, assisted by John Walsh and Lawyer. McJilton has been with the Butler Paper Company since its organization here, having come to Tulsa from St. Louis where he was associated with another Butler paper house, the Mississippi Valley Paper Company.

These alert and experienced young men have all been of material aid in the building of business for the Butler Paper Company, a firm which has had a remarkable record of success in Tulsa.

## Ohio Paper Firms Make Wage Agreements

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, August 2, 1937.—Affiliation of the employees of the Lawrence Bay Company of Middletown with the American Federation of Labor was announced this week by Walter F. Lawrence, president. Simultaneously, announcement of an increase in wages was made by the company official.

Conferences have been held between Mr. Lawrence and C. L. Mers, representing the company, and S. A. Stephens, of Fort Edwards, N. Y., International vice-president of the Brotherhood of Pulp, Sulphite and Paper Mill Workers, and Gus Miles, local American Federation of Labor organizer. One employee from each department in the plant served on the fraternization committee.

It was announced that two hundred and ninety employees will receive wage increases, effective August 1, and continuing under agreement until May 1, 1938.

An agreement with the Philip Carey Company of Lockland, signed by G. D. Crabbs, president of the company, providing wage increases, also has been announced. This agreement, which assures workers a general wage increase of 15 per cent, and a 40-hour work with time and a half for overtime and Sundays and holidays, will remain in force up to December 31, 1938. It also provides a vacation of one week with pay for all employees. The company employs 1,400 persons. The agreement includes employees of the Miami paper mill at Franklin.

The International Brotherhood of Paper Makers was represented in the negotiations by J. C. Furr.

These contracts mark the beginning of further pleasant relations with labor, representatives of the latter assert. Recently the Aetna Paper Company of this city, which has 300 employees, signed through the efforts of John W. Bailey. fourth vice-president of the Brotherhood. This agreement provides a 10 per cent increase in wages and an estimated 40-hour week, to remain in force until April 30, 1938. It was the first to be signed in the Miami Valley.

## To Make Rayon Pulp from Reeds

A process for the manufacture of rayon pulp from reeds is reported to have been patented by a chemical laboratory in Tokyo, Assistant American Trade Commissioner Carl H. Boeringer, Tokyo, has just reported to the Department of Commerce.

The reeds are first boiled in water at a temperature of from 120 to 170 degrees Centigrade and all water and waste liquids in them drained from the boiler and sulphite or bisulphite of magnesium is added to the fibrous emulsion in the boiler. After stirring the mixture, magnesium oxide or basic magnesium carbonate is added in order to neutralize the free sulphurous acid, the report states.

The resultant product is boiled again for a few hours and the crude pulp thus made is bleached and processed by hydrochloric, sulphuric, and nitric acids, it was stated.

It is reported that the process will be used by a cotton spinning company in its reed pulp plant in northern Manchuria "Manchukuo" and will utilize reeds grown in North China and Manchuria, according to the report.

DU PONT DYESTUFFS
REG. U.S. PAT. OFF.

THESE Du Pont dyestuffs, when used singly or in combination, produce such standard shades as: Goldenrod, Buff, Pink, Salmon, Cafe.

Their prime advantages are excellent fastness to light and minimum of two-sidedness, even when run on modern high-speed machines equipped with the suction couch roll.

The yellow possesses high tinctorial value and is very fast to light.

Du Pont brilliant Crocein FL is the fastest to light soluble aniline red used on paper, possesses higher affinity for paper than most acid colors and gives fairly clear backwaters even in deep shades.

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ORGANIC CHEMICALS DEPARTMENT DYESTUFFS DIVISION
*Wilmington, Delaware*

BRANCH OFFICES: Boston, Mass. Charlotte, N.C. Chicago, Ill. Philadelphia, Pa. Providence, R.I. New York, N.Y. San Francisco, Calif.

# Financial News of Pulp and Paper Industry

## Reorganization of Abitibi Proposes New Company—Grays Harbor Pulp and Paper Co. Closes Books With Net Income of $875,707—Consolidated Water Power & Paper Co. Increases Capital Stock to $10,000,000.

### New York Stock Exchange

High, Low and Last for the Week Ending August 4, 1937

| | High | Low | Last |
|---|---|---|---|
| Armstrong Cork Co. | 60¾ | 58⅛ | 60⅝ |
| Celotex Corp. | 42½ | 41 | 41 |
| Celotex Corp., pf. | 77¾ | 77 | 77 |
| Certain-Teed Products Corp. | 14¼ | 13¼ | 13½ |
| Certain-Teed Products Corp., pf. | 55½ | 51 | 52 |
| Champion Paper & Fibre Co. | 59 | 57¼ | 57½ |
| Champion Paper & Fibre Co., pf. | 108¾ | 108¼ | 108¼ |
| Congoleum-Nairn Co. | 38½ | 37¼ | 37¼ |
| Container Corp. of Amer. | 30½ | 29¼ | 30 |
| Continental-Diamond Fibre Co. | 19½ | 19 | 19 |
| Crown Zellerbach Co. | 20⅜ | 17⅝ | 20⅛ |
| Crown Zellerbach Co., cum. pf. | 99 | 95 | 99 |
| Flintkote Co. | 33⅜ | 30½ | 31½ |
| Robert Gair Co. | 14⅛ | 13½ | 13½ |
| International Paper & Power (a) | 19⅞ | 17¼ | 19¼ |
| International Paper & Power (b) | 14⅞ | 12⅛ | 14½ |
| International Paper & Power (c) | 7⅞ | 6⅜ | 7⅜ |
| International Paper & Power pf. | 107¾ | 96 | 106⅛ |
| Johns-Manville Corp. | 136¼ | 132¾ | 136¼ |
| Kimberly-Clark Corp. | 41 | 41 | 41 |
| MacAndrews & Forbes | 32½ | 32½ | 32½ |
| MacAndrews & Forbes, pf. | 129 | 129 | 129 |
| Masonite Corp. | 54 | 53 | 54 |
| Mead Corp. | 28½ | 27 | 28½ |
| Mead Corp., pf. | 95¼ | 94 | 95¼ |
| Paraffine Companies, Inc. | 68 | 68 | 68 |
| Paraffine Companies, Inc., pf. | 100 | 100 | 100 |
| Scott Paper Co. | 40 | 39¾ | 40 |
| Sutherland Paper Co. | 34¾ | 33 | 34¼ |
| Union Bag & Paper Corp. | 80¾ | 74 | 80¼ |
| United Paperboard Co. | 11⅛ | 10¾ | 11¼ |
| U. S. Gypsum Co. | 118 | 115½ | 116 |
| U. S. Gypsum Co., pf. | 162½ | 162 | 162½ |

### New York Curb Exchange

High, Low and Last for the Week Ending August 4, 1937

| | High | Low | Last |
|---|---|---|---|
| American Box Board Co. | 21⅜ | 20½ | 21⅜ |
| Brown Co., pf. | 79 | 78 | 79 |
| Great Northern Paper Co. | 40½ | 39 | 39½ |
| St. Lawrence Paper Co. | 12½ | 12¼ | 12½ |
| St. Regis Paper Co. | 9⅜ | 8⅜ | 7 |
| Taggart Corp. | 10⅞ | 10⅜ | 10⅞ |

## New Abitibi Company Planned

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., August 1, 1937—Under reorganization plan of the bondholders' representative committee of the Abitibi Power and Paper Company, Ltd., released last week, to be effective under the authority of the Ontario Judicature Act, a new company is to be organized, in which the assets of the old company are to be transferred. Holders of existing first mortgage bonds will receive general mortgage bonds, convertible debentures and common shares. First preferred holders, holders of 6 per cent preferred and existing common stock will receive warrants for additional common stock.

The bondholders' committee plan has the unanimous approval of the bondholders committee, of which Joseph P. Ripley is chairman, and it is announced that the preferred shareholders' committee, of which Lieut-Col. Herbert Molson, C.M.G.,M.C., is chairman, also has unanimously approved the proposal.

In order to provide sufficient cash for working capital and for rehabilitation and modernization and increase of capacity of plants and equipment, it is proposed that a new closed first mortgage bearing 4½ per cent interest from July 1, 1937 shall be created. This $14,000,000 15-year issue will be sold for cash.

In addition to subscription warrants the plan provides for the issuance of stock-purchase warrants entitling holders to buy not more than 5,000 shares of stock at not less than $20 a share. These stock purchase warrants are designed for distribution to members of the Abitibi operating staff.

Management of the new company is to be under a board of directors of 15 members. Eight "Class A" directors are to be nominated by the bondholders meeting and shall serve at least until 1943 or beyond then under certain defined conditions. The other seven directors are to be elected annually by the shareholders.

## Grays Harbor Shows Good Gain

Grays Harbor Pulp and Paper Company closed its fiscal year ended April 30 with a net income of $875,707 as against $527,447 for the corresponding 12-month period ended April 30, 1936.

In his report to stockholders, President Edward M. Mills said that, as in the previous year, sales volume was such as to require practically full capacity operation. Shipments were interrupted by the marine strike and shipping costs were considerably increased thereby.

Profit from operations before depreciation amounted to $1,655,800 against $1,161,759 for the preceding year. Depreciation amounted to $365,055 against $330,898; profit from operations, $1,290,745 against $830,861. Income before Federal income taxes totaled $1,092,721 compared to $615,392.

Balance sheet shows current assets of $1,067,277 against current liabilities of $1,095,822. Net current assets of $511,455 as of April 30 compare with $851,040 at the beginning of the fiscal period. Cash on hand and in banks totaled $297,877. Mills said the plan of recapitalization, under consideration for some months, is expected to be submitted to the stockholders at an early date. While some details are lacking ,he added, it is intended to offer the preferred stockholders an exchange of their preferred for new preferred with a right of conversion, during a specified period, into common stock "on an attractive basis and to reclassify the common stock into an increased number of shares."

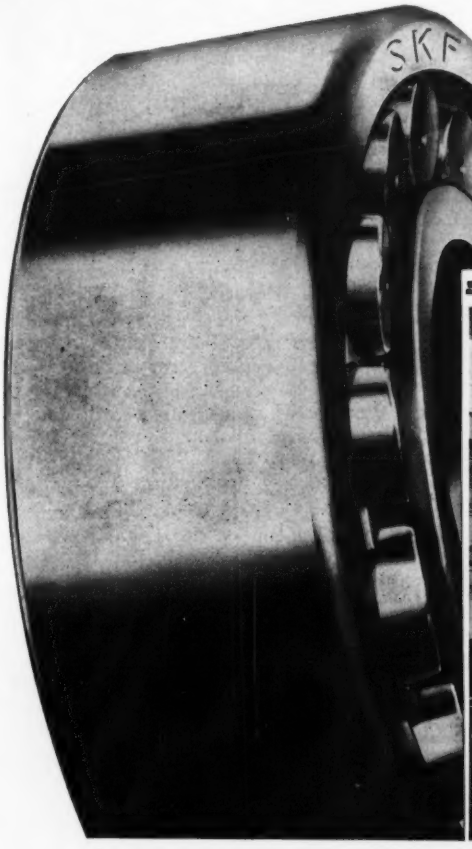
Some of the new convertible preferred will be offered to stockholders and the proceeds used to redeem indebtedness and to provide additional working capital.

## Consolidated Increases Capital Stock

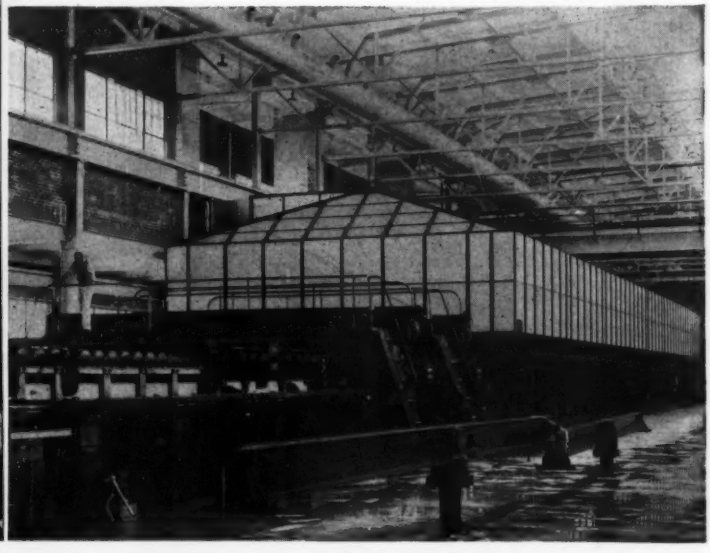
[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., August 2, 1937—Capital stock of the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., was increased from $8,000,000 to $10,000,000 by the shareholders at the annual meeting July 29 at the company's offices.

An encouraging report on earnings and outlook was given by George W. Mead, president, who explained the increase in capital stock involves no new




SKF-EQUIPPED BUILT BY PUSEY & JONES CORP.



# PRODUCTION STEPS UP

## *on paper machines equipped with* SKF *Bearings*

- The continuous production of a sheet of pulp 234" wide on this Kraft Bag Machine requires several things from SKF Bearings. It calls for free dryer cylinder expansion and contraction without imposing thrust loads on bearings or side frames. It necessitates proper alignment of rolls for long wire life. It demands dependability, reduced power and maintenance.

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BALL AND ROLLER BEARINGS

financing. It was merely in the nature of a distribution to the stockholders of surplus in the form of additional stock, he said.

The par value of the stock was changed from $100 a share to $25, thus effecting a four-to-one split.

The depression in the paper industry seems to be past, Mr. Mead told the stockholders. The turning point was reached the first of this year, he said, and the world paper market has shown a greater demand and better prices since. As evidence of confidence in the future, he cited the Consolidated's present expansion program announced last May involving expenditures of $1,500,000.

No figures were revealed on the company's earnings, but the president said the earnings for the first half of 1937 were "equal or better than those in the first half of last year." Production of newsprint has been given up and the mills have turned their machinery over to production of the new coated paper which it patented last year.

## Confirms Sale of Outagamie Mill

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., August 2, 1937—Sale of the Outagamie mill of the Patten Paper Company, Ltd. at Kaukauna, Wis. to the Kaukauna Electric and Water Utility, municipally owned, was confirmed at a hearing Saturday, July 24, before Judge Edgar V. Werner of the circuit court at Appleton, Wis.

The three-story stone building, land and water power were purchased at a sheriff's sale early in July on a bid of $4,850, plus delinquent taxes of $60,256. Acquisition of the property gives the utility rights to 32 per cent of all water power above the Kaukauna dam, and the only water rights on the Fox River not controlled by the Green Bay and Mississippi Canal Company.

No action will be taken at present by the utility to develop the water power. The property will be offered for lease, however, to any interested industry. The mill is one of the earliest developed at Kaukauna.

## Pine Falls To Be Expanded

According to word from Winnipeg, the Manitoba Paper Company, Ltd. at Pine Falls, Manitoba, will be improved to the extent of $814,000, increasing capacity of the mill to 300 tons daily. The extension program is part of the Abitibi Power and Paper Company's reorganization plans to be presented to bondholders of the company on October 15. Plans have been approved by the Shareholders' Protective Committee. Pine Falls is a subsidiary of Abitibi. Half of the $814,000 will be spent on the mill, $220,000 is to go towards townsite improvements. Probable disposition of the remaining $186,500 was not revealed.

## U. S. Gypsum $3,401,253 for Six Months

United States Gypsum Company and subsidiaries as follows for six months to June 30: Net profits after provision for Federal surtaxes, $3,401,253, equal after dividend requirements on 7 per cent. preferred stock to $2.62 each on 1,193,156 shares of $20 par common stock. Net profit last year was $2,241,774, or $1.65 each on 1,192,168 common shares. Net profit for year to June 30 last was $6,487,593, or $4.98 a share on common, compared with $4,105,549, or $2.98 a share, in preceding year.

## Luncheon Speakers Announced

T. G. Woolford and J. H. Allen will speak at the luncheon during the Fall Convention of the Technical Association of the Pulp and Paper Industry, October 18-20, Hotel DeSoto, Savannah, Ga. Following the technical meeting in the Gold Room of the Hotel DeSoto Monday morning, October 18, there will be a men's luncheon in the main dining room at which Col. Woolford will speak on Forestry Problems.

Col. T. Guy Woolford of Atlanta and Savannah is president of the Georgia Forestry Association. Col. Woolford is also chairman of the Forestry Committee of the Chamber of Commerce of the United States. He has long been interested in forestry in parks and in the preservation of Georgia's history. In the above capacities, Col. Woolford has been able to do much to promote forestry conservation and reforestation in the South.

Following the technical meeting Tuesday morning, October 19, there will be a second men's luncheon at which J. H. Allen will speak on the History of the Pulp and Paper Industry in the South. Jas. H. Allen is vice-president of the Union Bag and has been connected since its inception with the corporation's new mill and bag plant at Savannah, Ga. Mr. Allen's long connection with the Southern kraft industry and his position in the first post-depression mill make him admirably suited to make these remarks on the history of the Pulp and Paper Industry in the Southern pine lands.

There will be a formal banquet and ball for the convention guests and the ladies at the Hotel DeSoto, Monday evening, October 18. Judge Gordon Saussy of Savannah will be toastmaster. The TAPPI visitors will be welcomed to Savannah by Mayor R. M. Hitch. G. N. Collins, president of TAPPI will respond. Following this there will be remarks by Alexander Calder, president of the Union Bag and Paper Corporation and by Dr. Charles H. Herty, director of the Pulp and Paper Laboratory at Savannah. Dancing and entertainment follow the banquet.

Judge Saussy is an outstanding leader in the civic affairs of Savannah and Chatham County. He has twice been Mayor of the city of Savannah and for a number of years held the chairmanship of the State Port Committee. At present Judge Saussy is the Judge Ordinary of Chatham County, Ga., and Counsel for the Savannah Port Authority. As chairman of the Reception and Entertainment Committee, Judge Saussy has arranged an attractive and interesting program of entertainment for the visitors to Savannah during the days of the Convention.

## Paper Testing Report

The First Report of the Paper Testing Committee to the Technical Section of the Paper Makers Association of Great Britain and Ireland has been issued as a cloth bound book of 85 pages.

Among the chapters are the following: Sampling Paper for Testing; Conditioning of Paper Samples; Ream Weight Determination; The Folding Test; The Tearing Test.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 123 East 42nd street, New York, N. Y., at $1.25 for members, and $1.75 for non-members.

# BALANCE

## *Dynamic* AS WELL AS *Static*

One expects transmission equipment to be statically balanced, but Allis-Chalmers has now made, commercially available, a Texrope Sheave with the finest Dynamic Balance, for applications that require complete lack of vibration at all speeds. Not all applications require this extreme precision, but Allis-Chalmers has made it available for those that do, and the engineering ability capable of producing the Allis-Chalmers Dynamically Balanced Texrope Sheave is inherent in all Texrope equipment. • Allis-Chalmers engineers conceived and developed the multiple V-Belt principle, the Duro-Brace Texrope Sheave, Vari-Pitch Texrope Sheave, and now offer a new high standard in Dynamically Balanced Sheaves for Texrope V-Belt Drives. If you want the finest and the most advanced multiple V-Belt transmission equipment, for every application, you want Allis-Chalmers Texrope Drives.

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TEXROPE DIVISION

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MILWAUKEE WISCONSIN

# Dorr Co. Opens New Laboratories

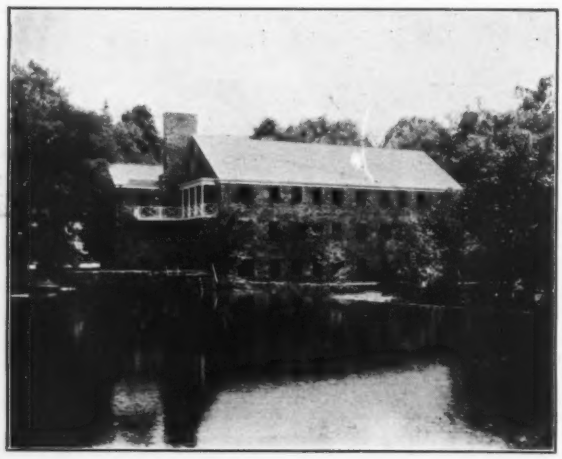
On the foundations of an ancient grist mill near Westport, Conn., dating from the period directly after the Revolutionary War, there have risen the modern research laboratories and test plant of the Dorr Company, of New York. This new plant "The Westport Mill," was opened officially last week with ceremonies attended by about two hundred guests—members of various branches of the engineering profession.

### A Research Plant in the Country

A conception of the "research plant in the country" is believed to be as uncommon today as it was twenty years ago, when the Dorr Company acquired the original grist mill and adapted it to research needs. The philosophy underlying this conception, according to John V. N. Dorr, president of the company, is that the country, with its quiet, peaceful surroundings, rather than the city with its noise and many urban distractions, is the logical place for scientists and research workers to work out complex problems. The result, he says, is a compact, self-contained research community, analogous to some of the industrial villages, like Hershey, Pa., that typify the "away from the city" movement of recent years. The mill itself is two miles from the center of Westport on a mill pond, formed by the damming of the Saugatuck and Aspetuck rivers at their point of union. Fifty acres of wooded and farm land have been acquired to insure against the intrusion of residential buildings or other commercial establishments, that might detract from the atmosphere sought. The entire research staff live within a mile or two of the mill.

### Adapted to Present Day Needs

Viewed from across the mill pond, the new building, built of local grey stone, retains the quaint early Connecticut appearance of the original grist mill of wood, built over a century ago. Even the original head gate and tail race are retained and are actually used for drawing large volumes of water through the laboratories for hydraulic studies. Within the building, the arrangement is entirely modern and adapted to present-day research needs. The analytical laboratory has accommodations for several analysts. The research laboratories are separate so as to isolate the work on different projects. The metallurgical laboratory is equipped for all types of testing on gold, silver, copper, lead and other ores; and the hydraulic laboratory in the basement is really a semi-commercial scale plant, capable of treating up to 50 tons a day of an ore or a chemical, and several million gallons of water a day.



"THE WESTPORT MILL"

Other tools of scientific research are installed in separate rooms—microscopes, delicate balances and scales, photographic apparatus and equipment for the study and measurement of particles only 1 micron (39/1,000,000ths of an inch) or two in diameter. The large library is filled with scientific reference books and bound volumes of the current technical press. A completely equipped machine shop has been provided for building special testing equipment and for making the rapid changes and repairs essential in such work.

### The Technical Staff

The technical staff, according to Mr. Dorr, is composed of men of varied experience with diversified professional accomplishments in chemistry, metallurgy and sanitation. Contact with the outside, he states, is maintained through their being called upon frequently to visit and supervise engineering operations all over the world. Before the burning of the old mill, and afterward in other buildings on the property, important scientific work was conducted there. Gold ores from Australia and South Africa, paper pulp from Georgia, turbid river water from Missouri, chemical pigments from New Jersey, petroleum residues from Texas and even river silt from Arizona, have been tested recently at Westport, as a basis for plant design.

### Fundamental Research Work

Here has centered much fundamental research work on manganese and beryllium, as well as studies leading to new methods of treating tannery, bleachery and dye house wastes, and the manufacture of titanium pigment and beet sugar. Cement rock has been treated by new processes to yield better and stronger cements, and better ways have been devised for purifying turbid middle western rivers for domestic water purposes, and for removing the public health hazard of sewage pollution. A test program here resulted in the world's largest river desilting plant at the head of the All American Canal in Arizona, where 70,000 tons of solids will be removed daily from 8 billion gallons of Arizona river water, to be used subsequently to irrigate the Imperial Valley in South California.

Mr. Dorr, who has a home near the mill, received his first training in research under Thomas A. Edison. He is a graduate and a trustee of Rutgers College, and is a past president of the American Institute of Chemical Engineers. He has been awarded the John Fritz Medal of the Franklin Institute of Philadelphia, an institution for the promotion of the mechanic arts, and the James Douglas Medal of the American Institute of Mining and Metallurgical Engineers, "for his inventions and other contributions to metallurgical practice."

# PAPER MILL EMPLOYMENT GAINS IN WISCONSIN

*(Continued from page 15)*

Ferguson plan calling for a combination of reservoirs in the headwaters of the Wolf and Embarrass Rivers, which are tributaries of the Fox River, and manipulation of the water levels in Lake Winnebago, where the control dam for the water power section is located. The lake level will be lowered in the late fall and winter while navigation is suspended to a point two feet below the crest of the control dam at Menasha, Wis., allowing room for spring thaws and freshets. It is contended the reservoirs would do as much for these valleys as the system of 23 reservoirs on the Wisconsin River.

### Reforestation Work by Consolidated

Further reforestation work has been accomplished by the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis. In its timberlands north of Summit Lake, Wis., the company has planted approximately 300 acres with 110,000 white spruce, according to E. B. Hirst, the company's chief forester. The plantings were made on a 1,600-acre tract in which the company has been doing selective logging since 1935. A crew of 60 men is cutting and peeling hemlock logs in this area, and about September 1 will begin the cutting of hardwood and skidding of hemlock.

### Notified Badger Paper Mills

Badger Paper Mills, Inc., Peshtigo, Wis., has been notified by the state committee on water pollution and the state board of health to intensify its efforts to reduce deposit of wastes in the Peshtigo River. Investigation followed complaint by 200 persons as to obnoxious odors and destruction of fish. Adolph Kannenberg, water power counsel of the committee, announced the company is doing all it can to reduce waste deposits, but urges further steps so as to comply more fully with the state law.

### Institute Students to Leave on Wood Course

First year students who enroll this fall at the Institute of Paper Chemistry, Appleton, Wis., will leave September 13 for northern Michigan where they will remain until September 22 for the annual "woods course." There are sixteen in the new class. They will study tree growth, learn how to estimate standing timber, observe lumbering and cutting of pulp wood, and study other phases of foresty. Lawrence College, with which the Institute is affiliated, has purchased the Beta Sigma Phi house at Appleton and will use it to house Institute students.

### Frank B. Whiting Buys Yacht

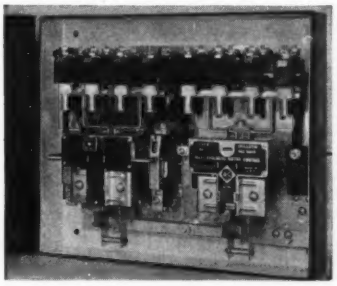
Frank B. Whiting, president of the George A. Whiting Paper Company, Menasha, Wis., has purchased a 47-foot cabined cruiser. It is being constructed at Brooklyn, N. Y. Mr. and Mrs. Whiting expect to leave some time this week for Brooklyn, and will return in the new boat, cruising down the St. Lawrence River and through the Great Lakes to Green Bay, and then up the Fox River to their home at Menasha.

### Paul L. Hackbert Transferred to Oshkosh

Paul L. Hackbert, who as agent of the Chicago and North Western Railway at Appleton Junction, Wis., for many years has directed the movement of paper mill traffic, has been transferred to Oshkosh, Wis., where he will be freight and passenger agent. Mr. Hackbert spent 33 years in railroad work at Appleton.

## Reversing Motor Starter

Allis-Chalmers Manufacturing Company Condit Works, Boston, Mass. announces a new reversing motor starter, designated type AP-7-R, furnished for 7½ hp., 550 volts, or less. The starter consists of two type AP-7 motor starter units, mechanically interlocked so that either unit cannot be closed if the other is closed. The starter units are equipped with Ruptors. The Ruptors consist of enclosing chambers



NEW REVERSING MOTOR STARTER

which confine and depotentiate the arc formed by circuit interruption. The greatly increase the interrupting ability of the contacts and form individual isolating barriers between contacts of opposite polarity. Other features are as follows: Large silver double break contacts—long life—no contact dressing needed; solenoid operated, vertical make and break —silent operation; unit construction—pole units consisting of individual molded bases mounted on a steel chassis—true contact alignment; enclosed temperature overload relays affording positive motor protection; under-voltage protection inherently provided.

## New Dart Union Catalog

Complete data on Dart pipe unions and fittings are given in the new catalog just published by the E. M. Dart Manufacturing Company, Providence, R. I. Full information on types, sizes, and prices is included with color illustrations showing the distinctive, full-bearing, true ball-joint construction. In addition to tables giving dimentions, catalog describes precision operations, materials, and inspection methods used in the manufacture of Dart Unions.

It also illustrates the processes of precision machining and oscillating—grinding the special two bronze seats—cutting accurate threads on tapping machines of Dart's own design—and testing the finished unions with air under water.

Copies can be obtained free by writing to Dart distributors or direct to the manufacturer.

# Obituary

### Joshua Clifton Mallalieu

Joshua Clifton Mallalieu, president for the last seventeen years of George W. Millar & Co., Inc., paper merchants, died after a long illness at his home, 168 Kilburn Road, Garden City, Friday of last week. His age was 62.

Mr. Mallalieu, who had passed forty-five years in the paper industry, was president of the National Paper Trade Association and formerly was president of the New York Paper Trade Association on three occasions.

He was the former vice-president and general manager of Charles F. Hubbs & Co. He joined the Millar company in 1919 as president, treasurer and director.

Surviving are his widow, Mrs. Mary Edna Mallalieu, a son, J. Clifton Jr., and a brother, William T. Mallalieu of Wilmington, Del. Funeral services were held in the home Sunday at 8:30 P. M. Burial was private.

### William Westbrook

[FROM OUR REGULAR CORRESPONDENT]

SAUGERTIES, N. Y., July 31, 1937—William Westbrook, 49 years old, vice-president of the Algonquin Paper Company, of Ogdensburg, brought his yacht to dock here this week in one of the worst electrical storms experienced this season and then dropped dead on deck. He was vacationing with his family when the storm came up and was stricken suddenly ill before he was able to reach a dock, a few miles north of this city. Medical aid hastily summoned said he suffered a heart attack which was caused by fear for the safety of his family. His wife and four children are the principal survivors.

## Make Burial Plans for Howard Howell

DAYTON, Ohio, August 2, 1937.—The body of Howell Howard, widely-known official of the Aetna Paper Company, Dayton, the Maxwell Company, Franklin and the Dayton Envelope Company, who was fatally injured in a polo game at Meadow Brook Club near Mineola, N. Y., on July 9 last, will be brought to Dayton in September, it was announced here this week.

The remains, now in a private crypt at Westbury, Long Island, will be buried in Dayton. Some time ago it was not certain whether interment would be in Dayton or Cincinnati.

The deferred interment is occasioned by the illness of Mrs. Howard, formerly Loretta Hines, daughter of the late Edward Hines, Chicago lumber magnate. Mrs. Howard collapsed after her husband's accident and for a time was in a serious condition. She had become the mother of a girl baby on a fortnight previous to the fatality. With her children, Howell, Jr., Loretta and Lynn, she had gone to New York to be near her husband who was scheduled to participate in a number of polo games, but due to the weather most of the contests were delayed. He was known as an expert horseman and the accident was due to the fact that his pony's front legs "coupled" as the rider attempted to retrieve a bounding ball. In the many years in which he had played polo in different sections of the country, he had never before met with a serious mishap.

## Japan Increases Paper Production

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 1, 1937—Production of machine made paper by members of the Japan Paper Manufacturing Association, which accounts for about 95 per cent of the total output of this paper in Japan, reached a total of 249,974 short tons during the first quarter of 1937. This represents an increase of 4 per cent over the previous period and 16 per cent over the corresponding period last year. Sales during the first quarter of the current year reached a total of 279,683 short tons, an increase of 5 per cent over the preceding quarter and 29 per cent over the first quarter of 1936.

The foregoing figures indicate that the close relationship between output and sales maintained during the first quarter of 1936 was completely upset during the first quarter of the current year. In view of the heavy demand for all kinds of machine made paper, consumers are complaining about the rise in prices and also that production appears to be restricted more than is necessary. The curtailment rate maintained by Association mills in January and February of the current year was 43.2 per cent. This was lowered in March to 39.7 per cent and for the months of April, May, and June there has been a further reduction to 37.7 per cent. Output of paper board and machine made paper, Japanese style, during the first quarter was restricted by 30 per cent capacity.

## B. P. Gately Starts New Business

BALTIMORE, Md., August 2, 1937—B. P. Gately, who last month severed his connections with the Allied Paper and Bag Corporation, Baltimore, Md., is now preparing to start a direct mill representative business with offices in the Emerson Tower Building, Baltimore.

From 1913 to 1918, Mr. Gately was employed as a reporter for the Bradstreet Company. Then he became connected with the Baltimore office of the Continental Paper and Bag Corporation, where he remained for fourteen years. In 1932, Mr. Gately became associated with the Allied Paper and Bag Corporation, being one of the founders of the enterprise.

Mr. Gately has a large following with the jobbing and baking trade, potato chip manufacturers and other consumers of specialty bags. He has had a wide experience handling grocer, millinery and notion bags, as well as specialty bags of all descriptions.

## Biochemistry of Cellulose

The Oxford University Press has just published a book by Dr. A. G. Norman on "The Biochemistry of Cellulose," the polyuronides, lignin, etc. and is obtainable from them at $5 per copy. It has 230 pages and is well illustrated with charts and tables.

The biochemistry of those complex substances which together form the structural fabric of plants has made great progress in the past two decades, largely through new weapons of attack. It is the purpose of this book to examine the present position of this development as a whole.

Among the chapter headings are: Cellulose, Pentosans, Hexosans, Tenicellulose, Pectin, Gums, Mucilages, Lignin, Uronic Acids and Pentoses.

## The Submerged Element of Building

The Submerged Element of the Building Business is the title of an interesting pamphlet just issued by the Morton C. Tuttle Company. The foreword of this rather unusual piece of literature states that: "There are at least two general types of building operation: one, where artistry is the prime consideration; the other—which covers by far the greater number of enterprises—constituting some form of financial investment. Much confusion arises from the failure to differentiate clearly between these two types of undertaking. A practical procedure for the one is not necessarily applicable to the other. We have no occasion here to discuss the procedure involved in a project in which architectural effect is the chief desideratum. But where investment in construction is to be justified by cash returns, rather than by esthetic satisfaction, the consideration of ways and means of combating a high index of building cost is not merely pertinent, it is imperative."

A copy of this pamphlet may be obtained by addressing the company at the Park Square Building, Boston, Mass.

## Screen Plate for Paper Making Machines

Ralph E. Cleveland, Waterbury, Conn., under date of July 6, 1937, was granted United States patent No. 2,086,067 on a screen plate for paper making machines. The invention relates to screen plates of the type employed in paper making machines for screening the wet pulp during the course of its manufacture into paper sheets. This is the so called open-back screen plate which the Chromium Corporation of America, 120 Broadway, New York, introduced and which it has advertised for some time past.

The invention covers six claims as follows:

1. A screen plate for paper manufacture comprising a plate having successively arranged sets of parallel grooves with intervening ribs at its underside, and successively arranged sets of parallel slots in its upper or face side, at least two of which slots open into each of the said grooves, the said sets of grooves meeting at their adjacent ends at a point above the lower surface of the plate, said plate being coated with chromium.

2. A screen plate for paper manufacture, comprising a plate having successively arranged sets of juxtaposed parallel grooves with intervening ribs at its underside, and correspondingly arranged sets of juxtaposed parallel slots in its upper or face side, the slots running parallel with said grooves and at least two of said slots opening into each of the said grooves the slots and grooves in adjacent sets being positioned in a general end-to-end relation and, the individual grooves in one set being out of alignment with and staggered with respect to the opposed grooves in the adjacent sets, said plate being coated with chromium.

3. The screen plate of claim 4 wherein the depending distance of said reinforcing ridges is less than half that of said ribs.

4. A chromium plated screen plate for paper manufacture comprising a plate having an upper or face side and a lower or discharge side, successively arranged sets of juxtaposed parallel slots in its upper side and successively arranged sets of juxtaposed parallel grooves in its lower side, at least two of which slots open into each of said grooves, low reinforcing ridges between the slot openings in each groove depending to a substantially lesser extent than the ribs forming the walls of the grooves, said grooves meeting at their adjacent ends at a point above the lower surface of the plate.

5. The screen plate of claim 4 wherein the individual grooves of each set run parallel to said slots and are staggered with respect to the opposed, parallel grooves in adjacent sets.

6. A chromium plated screen plate for paper manufacture comprising a plate having an upper or face side and a lower or discharge side, successively arranged sets of juxtaposed parallel slots in its upper side, the slots in each set being aligned with the slots of adjacent sets, correspondingly arranged sets of juxtaposed parallel grooves in its lower side, said grooves being parallel to and communicating with said slots, the individual grooves in each set being out of alignment with and being staggered with respect to the opposed grooves of the adjacent sets.

## Eastern Container Co. Organizes

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., August 3, 1937—The Eastern Container Company has been organized to manufacture cardboard shipping boxes and has rented space in the former Riverside No. 1 mill. Frank A. Gerace of Chicopee is president and general manager. A staff of about 10 men will be employed at first. About $20,000 worth of machinery is being installed including one of the largest box making machines in New England. Some 8,000 square feet has been rented of the American Writing Paper Corporation which owns the building. Mr. Gerace was formerly general manager of the New England Container Company of Chicopee and started in the business with the Container Corporation of America at Brooklyn, N. Y. and later was with the Gibraltar Corrugated Paper Company of North Bergen, N. J.

## Japan Imports More Pulp

WASHINGTON, D. C., August 1, 1937—Imports of wood pulp to Japan during April reached a total of 47,943 tons, of which amount 27,272 tons were imported for the rayon industry, and 20,671 tons for paper making, according to a report from Commercial Attache Frank S. Williams at Tokyo. April receipts represent an increase of 38 per cent over March and 79 per cent over the corresponding month last year. Imports from the United States amounted to 18,859 tons, an increase of approximately 50 per cent over April, 1936. It is reported that the Government will permit during 1937 the importation of 125,000 tons of pulp for paper making and 150,000 to 175,000 tons for rayon production.

## Charge Violation of Anti-Trust Laws

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 4, 1937.—The Department of Justice admits that it is making a preliminary investigation as the result of a complaint filed with it by John H. Perry, president of the American Press Association to the effect that foreign and domestic newsprint manufacturers are violating the Sherman anti-trust laws and that differentials are allowed different companies. The Department refuses to make any statement further than the fact that such a survey is being made.

# CONSTRUCTION NEWS

*A Summary of Vital Facts Regarding Construction, Finances and Operation of Pulp and Paper Mills*

## General Construction News

**Bellingham, Wash.**—The Puget Sound Pulp and Timber Company has plans maturing for new addition to mill, comprising several one and multi-story buildings to form a new unit for unbleached sulphite pulp production. It will be equipped for a rated capacity of 40,000 tons per annum, increasing the plant capacity from 60,000 to 100,000 tons a year. New structures will be located on site adjoining present mill and superstructure is scheduled to begin in near future. The expansion is estimated to cost about $2,600,000. Company is arranging financing in gross amount of $2,500,000 through the sale of 125,000 shares of new preferred stock, entire proceeds to be used for the purpose noted. Ralph M. Roberg is general manager.

**Richmond, Va.**—The Manchester Board and Paper Company, Hull street, manufacturer of chip board, manila papers and other stocks, has plans for new boiler house at mill and will proceed with work at early date. An award for boiler foundations has been let to Allen J. Saville, Inc., Electric Building, Richmond. New boiler unit and auxiliary equipment will be installed. It is estimated to cost over $25,000, with equipment.

**Fernandina, Fla.**—The Fernandina Pulp and Paper Company, Fernandina, recently organized under Delaware laws, closed bids on August 4 for construction of proposed new sulphite pulp mill at Fernandina, lately noted in these columns, and will award contract at early date. It is proposed to begin work on project about the middle of August, with plant completion scheduled about twelve months later, or August 1938. As previously noted, company has acquired a tract of about 175 acres of land in the harbor area at Fernandina, with large frontage on the Amelia River. Awards are being placed for dredging and piling work and this construction will start at once. Initial plant will be given over to sulphite pulp production, using Southern pine for raw material. Several one and multi-story buildings will be erected to be equipped for a capacity of 180 tons per day, with power house, pumping station, machine shop and miscellaneous units. New plant is estimated to cost close to $6,000,000, including the development and operation of timber properties.

**Merrill, Wis.**—The Ward Paper Company, recently organized to take over and operate a local mill, idle for some time past, has plans for new one-story addition to plant, to be used as a pulp storage building. Superstructure will be placed under way soon. No estimate of cost has been announced. Abe Vanderberg is vice-president in charge of mill operations.

**Baltimore, Md.**—The Eastern Box Company, East Brooklyn, Baltimore, manufacturer of corrugated paper boxes and containers, has work under way on new one-story addition to plant on Asiatic avenue, previously referred to in these columns, and has awarded a number of miscellaneous sub-contracts for erection, including reinforcing steel to Dietrich Brothers Company, 220 East Pleasant street; lumber, to the Atlantic Mill and Lumber Company, 800 East Caroline street; and for glass, to the Pittsburgh Plate Glass Company, 8 South Paca street, all Baltimore. New unit will be pushed to early completion and is estimated to cost approximately $40,000, with equipment. Kubitz & Koeniz, Emerson Tower Building, Baltimore, are consulting engineers. General erection contract is being carried out by the Engineering Contracting Corporation, North and Linden avenues, Baltimore.

**Boston, Mass.**—The A. & P. Corrugated Box Corporation has been organized with capital of 5,000 shares of common stock, equally divided into Class A and B stocks, to manufacture corrugated boxes and containers. New company will take over and succeed to the A. & P. Corrugated Box Company, with local plant at 33 Troy street. Officers of the new organization are: Morris Appel, president; Benjamin Peterfriend, vice-president; and Julius Poverman, treasurer.

**Franklin, Va.**—The Chesapeake-Camp Corporation, formed with capital of $3,500,000 several months ago, as previously noted in these columns, has active work in progress on erection of new local pulp and paper mill, and proposes to have plant ready for operation before the close of the year. The mill will specialize in the production of kraft liner board, kraft wrapping papers and other kraft paper stocks, and will be equipped for an initial capacity of about 200 tons per day. A Fourdrinier paper-making machine will be installed, with wire-width of 210 inches, trimming to 198 inches for board stocks and 196 inches for paper run. The unit will have a speed of 1,200 feet per minute. The Rust Engineering Company, Clark Building, Pittsburgh, Pa., is general contractor for erection. Plant will represent an ultimate investment of close to $3,000,000. Company is a joint interest of the Albemarle Paper Manufacturing Company, Richmond, Va., the Chesapeake Corporation, West Point, Va., and the Camp Manufacturing Company, Franklin. J. L. Camp, Jr., is president.

**Ashland, N. H.**—The Bridgeport Paper Company, 139 Plymouth street, Brooklyn, N. Y., specializing in the production of tissue paper goods, plans early modernization and reconditioning of Ashland Mill of the Continental Paper & Bag Corpora-

tion at Ashland, recently acquired, idle for a number of months past. Plant will be converted for production of line of tissue products, noted, with equipment facilities for employment of close to 150 workers. A new corporation will be formed under New Hampshire laws to operate the property. It is proposed to have the mill ready for service at early date.

**Niagara Falls, N. Y.**—The General Abrasive Company, College avenue and Hyde Park boulevard, manufacturer of materials for abrasive paper stocks, has filed plans for new one-story addition, to be used in part for storage and distribution. General erection contract has been let to the Scrufari Construction Company, 825 Fifteenth street, Niagara Falls, and work on superstructure will proceed at once. New unit will cost over $25,000, with equipment.

**Savannah, Ga.**—The Union Bag and Paper Corporation, Woolworth Building, New York, N. Y., has made application for Federal permission to construct a wharf and ramp on the New River at Daufuskie Island, S. C., about four miles above the mouth of the stream, to be used for shipping service in connection with new mill at Savannah, now in operation, primarily for raw material handling. No estimate of cost has been announced. It is proposed to begin work at early date.

**Nipigon, Ont.**—The Lake Superior Company, Ltd., has acquired the common stock interest of the Canadian International Paper Company, Montreal, Que., in the Nipigon Corporation, Nipigon, with local ground wood pulp mill of close to 60 tons rated daily capacity. The Lake Superior Company will take over the operation of the property at early date, removing main offices from Montreal to mill site.

### New Companies, etc.

**Hoquiam, Wash.**—The Grays Harbor Pulp and Paper Company, operating a local sulphite pulp mill, has authorized financing through the sale of 244,662 shares of $25.00 par value, preferred stock, proceeds to be used for additional working capital, general financing of current obligations, operations, etc.

**Wilmington, Del.**—The Western Paper Products Company, care of Charles G. Guyer, Equitable Building, Wilmington, has been chartered under Delaware laws with capital of $25,000, to manufacture and deal in paper products. The incorporators include M. E. Pinder and O. B. Clayton.

**Boston, Mass.**—The National Card and Paper Company, 2451 Washington street, Roxbury, has filed registration of company organization, to deal in paper products of various kinds. Merritt Stegman is head.

**Port Angeles, Wash.**—The Olympic Forest Products Company, operating a local sulphite pulp mill, has arranged for sale of 159,998 shares of $25.00 par value preferred stock, and 225,876 shares of $1.00 par value common stock, proceeds to be used for general financing and operations, including additions in working capital.

## Goes with Mid-States Gummed Paper Co.

Burton Lee Trodson has been appointed advertising and sales promotion manager of the Mid-States Gummed Paper Company, Chicago, effective immediately. Mr. Trodson has been active for many years in the printing and label field, and has had considerable experience in poster stamp work.

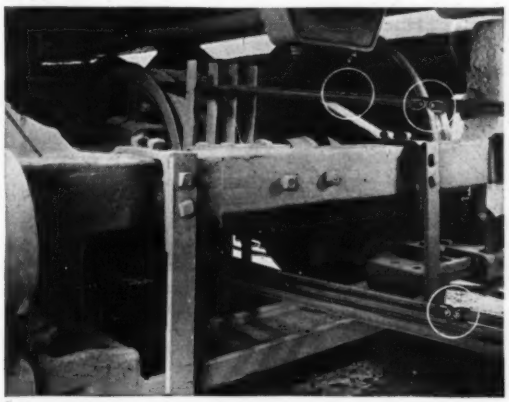
## Alligator "V" Belt Fasteners

A new fastener for joining "C" section "V" Belts of fabric core, cross weave construction, is announced by the Flexible Steel Lacing Company of Chicago. The Fastener makes practicable the installation, shortening or replacement of "V" Belts on

THE FASTENER

the job without delays or the necessity of tearing down expensive installations.

Unique features of the Alligator "V" Belt Fastener are the double rocker pin supported in bronze bushings and the method of holding the end plate to the belt end without materially weakening the belt or bulging its sides. The Rocker Pin is made of special alloy steel hardened to give long lasting service. No metal touches the pulleys. Application of



APPLICATION OF THE FASTENER

the fasteners is rapid and easily made through the use of illustrated directions and tools supplied by the manufacturer.

The Alligator V Belt Fastener was developed in cooperation with several railroads in the heavy duty services of axle lighting and air conditioning of passenger cars where it made an excellent service record. It has been tested and improved for several years and is now being supplied for general distribution.

## Worthington Orders at Higher Level

Unfilled orders of Worthington Pump and Machinery Corporation on July 1 were 81 per cent greater than on the same date last year, and were at the highest level in 17 years, H. C. Beaver, president, announced last week.

As a result, he said, "The principal plants of the corporation at Harrison and Newark, N. J., and at Buffalo, N. Y., are operating at a high percentage of capacity, and the Corporation's Holyoke, Mass., plant, which was recently reopened, is rapidly expanding production. Many lines of industry served by the company, covering railroads, public utilities, shipbuilding, automobiles, steel, chemical process and paper industries, oil refineries, gas and oil pipe lines, and a wide variety of miscellaneous enterprises, contributed to the increase in orders."

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## COMING EVENTS IN THE PAPER INDUSTRY

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY—Fall Convention, DeSoto Hotel, Savannah, Ga., Oct. 18-20, 1937.

NEW ENGLAND SECTION, Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Nonotuck Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION, Technical Association of the Pulp and Paper Industry—Fourth Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION, Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION, Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park-American Hotel, Kalamazoo, Mich.

## FOREIGN PAPER TRADE HIGHER

Exports of paper and paper products continued to show an upward trend during May, according to figures just released by the Forest Products Division of the Bureau of Foreign and Domestic Commerce. The aggregate value of these shipments amounting to $2,981,900 surpassed those of the preceding month by 17 per cent and were 51 per cent higher than during the corresponding month in 1936. While this increase compared with a year ago was due to some extent to higher prices, a comparison of those items for which weight as well as value was recorded shows an average increase in volume of 31 per cent.

Nearly all classes contributed to the rise in the May exports compared with a year ago. Among the leading items in the schedule, we find an increase of 61 per cent in writing papers, and 47 per cent in overissue news. Some of the largest increases proportionately appeared among such minor items as kraft wrapping, bristols, blotting paper, filing folders, envelopes, and vulcanized fiber.

In the board group, box boards failed to attain to the level of May 1936, although showing a rise of nearly 50 per cent over April. Shipments of other paper boards, however, were 33 per cent above a year ago, sheathing and building papers 53 per cent higher, and fiber insulating board 34 per cent higher. Among the few classes which failed to attain the level recorded for May 1936 were newsprint paper, boxes and cartons, hanging paper, wallboards, box boards, and cover paper.

Exports of paper base stocks during May for the first time closely approached exports of paper and paper products in value. The month's exports reached an aggregate value of $2,246,731 as against $1,354,816 in April and $870,782 during May 1936. Shipments comprised 18,176 tons of bleached sulphite, 11,940 tons of unbleached sulphite, 390 tons of other wood pulp, 1,928 tons of rags, and 5,306 tons of other waste. The rise in the May shipments was largely due to the increased amounts of bleached and unbleached sulphite exported that month which more than doubled the amounts recorded for May 1936. Exports of rags of a value of $50 per ton or over also nearly doubled, and exports of other waste was nearly treble the amounts recorded for May 1936.

Imports of paper and paper manufactures during May reached a value of $11,576,938, an increase of 5 per cent over the preceding month and of 13 per cent over May 1936. Newsprint paper as usual acmounted for the bulk of these imports. May receipts of this item totalled 279,936 tons, valued at $10,348,263, an increase in volume of 6 per cent over both the preceding month and the corresponding month in 1936. Reflecting the higher prices in effect the value of the May receipts exceeded those of May 1936 by 11 per cent.

Imports of other classes of paper and board dropped off slightly, 3 per cent, in aggregate value compared with April, but were 33 per cent higher than during May of last year. One of the few items which failed to reach the level of either the preceding month or the corresponding month in 1936 was kraft wrapping paper. May imports of this particular class were 40 per cent under the amount recorded for April and 15 per cent under May 1936. Offsetting this decline to some extent, May receipts of greaseproof and waterproof papers were more than double those recorded for either of the other two months. Other outstanding increases compared with last year occurred in receipts of "other printing papers," tissue papers, writing papers, cigarette paper, and pulpboard in rolls. The aggregate value of imports of paper and paper products, exclusive of newsprint, came to $1,228,675 during May as against $1,263,126 in the preceding month and $925,112 for May 1936.

Imports of wood pulp into the United States picked up considerably during May, the aggregate volume for the month—213,074 tons—exceeding any other month since the first of the year and surpassing receipts for the corresponding month last year by 27 per cent. The rise in imports of unbleached sulphite during May are particularly noteworthy, receipts exceeding those of May 1936 by 50 per cent. Imports of unbleached sulphate pulp, bleached sulphite, and mechanical pulp were between 15 per cent and 20

per cent higher than a year ago. A decrease of 387 tons in receipts of soda pulp was more than offset by a rise of 2,972 tons in bleached sulphate.

Imports of pulpwood during May were 16 per cent higher in volume than the amount recorded for the corresponding month last year. Imports of waste, however, were less than in the preceding month of May 1936. Imports of rags declined approximately 25 per cent compared with either of the other two months. Imports of other waste was 12 per cent higher than during May 1936 but was nearly 20 per cent under the volume of the April receipts.

Total imports of paper base stocks during May were valued at $9,906,257 comprising: 213,074 tons of wood pulp valued at $8,574,503; 73,350 cords of pulpwood valued at $644,859; and 17,816 tons of rags and other waste valued at $686,895.

## Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 4, 1937—The Government Printing Office has received the following bids for 52,000 pounds of 25 per cent rag, 34 x 44 yellow bond paper: Aetna Paper Company, 14.348 cents per pound; R. P. Andrews Paper Company, 15.4 cents; Marquette Paper Company, 14.25 cents; Walker, Goulard Plehn Company, 14.35 cents; Barton, Duer & Koch Paper Company, 13.97 cents; Stanford Paper Company, 14.35 cents; Paper Corp. of U. S., 15.39 cents; Reese & Reese, Inc., 12.34 cents; Whitaker Paper Company, 14.35 cents; Old Dominion Paper Company, 21.9 cents; L. Hyman & Sons, 14.14 cents; and Mount Holly Paper Company, 13.5 cents.

For 5,900 pounds of 26 x 38 high finish sulphite manila tag board: Reese & Reese, Inc., 8 cents per pound; and Whitaker Paper Company, 7.84 cents.

For 26,920 pounds, of 50 per cent rag, 24 x 38 buff ledger paper: Aetna Paper Company, 12.748 cents per pound; Graham Paper Company, 13.45 cents; Mount Holly Paper Company, 15 cents; Barton, Duer & Koch Paper Company, 12.46 cents; Reese & Reese, Inc., 14.60 cents; Whitaker Paper Company, 15 cents; R. P. Andrews Paper Company, 13.45 cents; Mathers-Lamm Paper Company, 14.1 cents; Lee Paper Company, 13.95 cents; and Paper Corp. of U. S., 16 cents.

## Warns Against More Expansion

With the realization of the immense importance of the recent pulp and paper mill expansions in the South, Morris Gintzler, vice-president of J. Andersen & Co., has prepared an article on "New Pulp and Paper Developments in the South. Quo Vadis?," which appears in the Summer issue of the bulletin of the Norwegian Chamber of Commerce, Incorporated, 115 Broad street, New York City.

Mr. Gintzler feels that the developments already planned are adequate enough to supply the increased demand for kraft pulp and its products, but still further expansion "would be an indication of the lack of leadership in this industry." Production would be far in excess of consumption and the "inevitable failures and disappointments" would ensue.

## Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association:

COMPARATIVE MONTHLY SUMMARIES

| Months | 1937 | 1936 | 1935 | 1934 |
|---|---|---|---|---|
| January | 90.3% (c) | 76.1% | 65.8% | ..... |
| February | 90.1% (c) | 77.9% | 70.0% | ..... |
| March | 90.3% (c) | 76.0% | 70.5% | ..... |
| April | 92.1% (c) | 82.3% | 70.0% | ..... |
| May | 90.6% (c) | 81.6% | 69.4% | ..... |
| June | 87.4% (c) | 80.7% | 72.3% | ..... |
| July | ..... | 77.3% | 64.9% | ..... |
| August | ..... | 81.5% | 70.9% | ..... |
| September | ..... | 80.5% | 71.9% | 58.2% |
| October | ..... | 87.6% | 75.6% | 64.7% |
| November | ..... | 88.0% | 75.3% | 61.7% |
| December | ..... | 85.9% | 71.2% | 59.6% |
| Year Average | ..... | 81.3% | 70.5% | ..... |
| Year to Date | | | | |
| First 29 weeks.. | 89.2% (c) | 78.7% | 68.9% | ..... |

COMPARATIVE WEEKLY SUMMARIES

| CURRENT WEEKS, 1937 | | CORRESPONDING WEEKS, 1936 | |
|---|---|---|---|
| *July 10 | 70.2% | July 11 | 75.6% |
| *July 17 | 88.9% | July 18 | 80.0% |
| *July 24 | 85.0% | July 25 | 80.3% |

The following statistics show the number of mills reporting by ratio groups:

| Ratio Limits | Number of Mills Reporting, Current Weeks: July 10, 1937 | July 17, 1937 | July 24, 1937 |
|---|---|---|---|
| 0% to 50% | 84 | 42 | 40 |
| 51% to 100% | 229 | 247 | 180 |
| Total Mills Reporting | 313 | 289 | 220 |

* Subject to revision until all reports are received.
(c) Basic capacity data have been adjusted to correspond with ratings reported on January 4, 1937 Machine Improvement Survey.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours," were as follows:

| Mos. | 1937 | 1936 | 1935 | 1934 | Mos. | 1937 | 1936 | 1935 | 1934 |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 80% (e) | 61% | 61% | .... | July | .... | 69% | 59% | .... |
| Feb. | 86% (e) | 67% | 67% | .... | Aug. | .... | 75% | 65% | .... |
| Mar. | 87% (e) | 68% | 67% | .... | Sept. | .... | 76% | 69% | 62% |
| Apr. | 89% (e) | 70% | 61% | .... | Oct. | .... | 82% | 76% | 63% |
| May | 86% (e) | 68% | 61% | .... | Nov. | .... | 79% | 70% | 56% |
| June | .... | 68% | 65% | .... | Dec. | .... | 74% | 60% | 52% |

Week end. June 5, 1937—76%
Week end. June 12, 1937—82%
Week end. June 19, 1937—71%
Week end. June 26, 1937—79%
Week end. July 3, 1937—76%
Week end. July 10, 1937—44%
Week end. July 17, 1937—73%
Week end. July 24, 1937—74%

(e) Basic figures revised to include new members of the National Paperboard Association.

## Newsprint Must Have Watermark

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 28, 1937—A Uruguayan decree which became effective on July 15, modifies the regulations for the duty-free entry of printing paper for newspapers, by reestablishing the requirement that newsprint paper must bear a translucent watermark in the form of parallel lines four centimeters apart, with a tolerance of one centimeter, according to a report dated June 1, from Consul Augustin W. Ferrin, Montevideo.

Newspaper establishments must register with the Administration General of Customs and with the Bureau of Industries in order to be entitled to the privilege of duty-free importation of newsprint paper, but they must agree not to sell such paper to companies who are not registered, and therefore are not entitled to duty-free importation. Newspaper companies benefiting by the provisions of this decree are not permitted to use newspaper paper imported under other conditions than those mentioned above. Exemption is made of stocks on hand when the decree becomes effective, which may be consumed under control of the Bureau of Industries.

# OFF WITH ITS DOME!

AND in with the chlorine. That may seem to be about all there is to filling liquid chlorine tank cars. But Herbert Hurd, tank car loader at Mathieson's Niagara Fall's plant for twelve years past, will tell you differently—will tell you that his company takes just as much pains to deliver your chlorine in trouble-free containers as it does in producing the chlorine itself.

After every trip, each Mathieson chlorine car is blown off with specially dried air to remove every trace of remaining chlorine; all valves are taken to the shop, reconditioned and carefully tested under pressure; safety valves are removed and tested to insure proper functioning; the car interior is closely inspected. All cars are filled on accurate scales to slightly above the final shipping weight; the excess chlorine is then blown off to eliminate air from lines and valves. A final test with ammonia vapor double-checks the valves and dome connections for any possible leaks.

This whole procedure would mean very little, however, if Mathieson didn't have men like "Herb" Hurd to put it in practice. Skillful, loyal and keenly aware of the significance of their jobs, these men are Mathieson's best assurance to chlorine users of a pure product in trouble-free containers.

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Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

# Recent Developments in Filler Clays*

By C. G. Albert[1]

*The most likely improvements in paper clays expected to result from increased research work are greater uniformity, more clays with selected particle size ranges, and higher brightness clays. Research work on this last subject has already made possible the production of clay with 95 brightness.*

*The retention of fillers in the sheet has been shown by a number of writers to take place by a mechanism involving not only filtration, but also adsorption of the filler, diffusion into the fiber, and occlusion by resin and aluminum hydrate flocs. The retention depends upon a large number of factors, of which a few are particle size and shape, pH, nature of pulp, temperature, amount of size and alum added, etc.*

*Micrographic study of the surfaces of blackened sheets indicates a possibility that a shifting, for example, of a coating with respect to the rawstock (a flow under pressure which occurs during calendering) causes sufficient irregularities in the sheet to give a mottled, somewhat blackened appearance. The shadows of these irregularities in the relief structure are not suggested to be the only type of blackening, but are quite likely a contributing factor.*

From time to time during the past years papers have been presented before this association dealing with the improvement in quality of the domestic clays and their consequent suitability for use in a growing number of applications in the paper industry, both as filling materials and as coating pigments. The statistics dealing with the respective sales of domestic and imported clays are ample evidence that the need for such discussion no longer exists since the paper industry has accepted the domestic clays.

Although this paper is part of a filler symposium we shall not entirely exclude coating clays from consideration. The fact that so many grades of clay are used in both ways makes any sharp differentiation between the grades impossible.

For the number of reasons, the changes during the past few years in control methods for filler clays have been less decided than in the case of clays ordinarily used for coating paper.

A clay, in order to be satisfactory for use as a paper filler, should correspond within reasonable limits to established standards regarding its freedom from grit and other coarse impurities, its color, its suspension properties, its dryness as shipped, and its acidity.

Filler clays may be divided into the two general classes of those which have been wet processed, that is, water-washed, and those which have simply been pulverized and air-separated from their impurities to some slight degree. Some filler clays have been not only water washed, in the usual sense but subjected to additional refining processes.

As the number of steps in the refinement of the clay is increased, so are the possibilities of controlling the quality of the clay increased. The air-floated clay offers two, or at the most three, properties capable of being controlled. Its moisture content can be held at a low level. It can be made to pass a satisfactory screen test by control of the pulverizing, although this screen test will simply indicate the degree of subdivision of the clay and its impurities, and not the absence of such impurities. The other properties of such a clay must exhibit the same variations to be found in the original crude clay, although such a quality as color can be regulated to some extent by the selection of the crude clay used, rejecting such amounts of crude as are seriously off color.

In the case of a water-washed clay, it is practicable to make the complete series of tests for grit, suspension properties, color, pH and moisture content. The important thing is that the process of treatment presents some possibility of obtaining fair uniformity in these properties by the careful treatment control which is becoming more and more widely used.

The wet treatment makes possible the removal of such impurities as mica, silica, and others, to a greater extent than is possible in a dry processed clay. This makes careful selection of the crude less essential, and the finished product will, in general, exhibit a much greater uniformity than a dry-processed clay.

The advantage of clays which have been subjected to further refining processes in addition to the usual water washing is two fold, namely, higher standards may be established with respect to color, freedom from grit, etc., and these standards, although more exacting, can be adhered to with less variation.

In the case of filler clays of this type even the particle size distribution can be kept remarkably free from variation despite unavoidable non-uniformities in the crude clay prior to treatment. The shrinkage of a clay bar upon firing, while of interest chiefly to the ceramist, gives in a general way quite a reliable picture of the particle size distribution. One of the highly processed domestic filler clays, which also finds wide application in the ceramic industry has been shown to have a practically identical shrinkage value over long production periods. Obviously, such a clay may be reasonably expected to show minimum variations in retention due to changes in particle size distribution.

In the case of clays to be used for the coating industry

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it has been found possible to carry out not only the same group of tests used for filler clays, the standards being of course somewhat higher in line with the further refinement of such clays, but in addition some other practical tests have been initiated.

An important quality of a coating clay not definitely indicated by the above series of tests, is its flowing properties. In order to keep in touch with this characteristic, production samples of coating clays are regularly tested in our laboratories for the viscosity of their aqueous suspensions. For this purpose a viscosimeter of the revolving cylinder type has been found most suitable. The casein solution used has as much influence or more upon the flowing properties of the finished coating color than does the clay itself. Nevertheless the results brought about by the introduction of viscosity control have been satisfactory. It may be added that when this test was begun serious variations in flowing properties were occasionally discovered, but subsequent improvements in the processing of the clays have resulted in a very gratifying uniformity of viscosity.

Since the ultimate proof of the pudding is in the eating, production samples of coating clays are used, at frequent intervals, for the preparation by a standardized procedure, of brushout sheets, which are calendered and tested for gloss and brightness. These sheets are also periodically tested for such other properties as smoothness, ink receptivity, and adhesion of the coating.

In many respects this form of testing, carried out with a duplication to as great an extent as possible of the condition under which the clay will be used, is the most informative we have.

### Research in Clays

The domestic clay producers have been able during the last ten years to maintain a distinct upward trend in the quality of their products. At the present time more research and development work is in progress than ever before. It is reasonable to expect that such work will lead to two major results.

The uniformity of the clay produced, already far above what was once considered satisfactory, will be improved. The production of clay is being changed from a purely mining operation more and more to a manufacturing industry. As a better understanding of the treatment processes grows, so does the ability to turn out a more uniform product.

The production of clays particularly suited to special applications by means of the selection of particle size ranges is a familiar development. This field has not yet been exhausted. Further investigation of the effect of particles of various sizes may well lead to increased application of this process to paper clays.

One recently studied method of color improvement deserves individual attention. Within the past year a process has been worked out sufficiently to make possible the production on a commercial scale of Georgia clay with a brightness in the neighborhood of 95 as determined from the spectrophotometric reflectance curve. In addition to raising the brightness to an unprecedented level, other characteristics of the clay are completely altered. When used in coating paper, a surface unlike any other I have ever seen results. The surface is very smooth and has a high gloss if observed at the proper angle. However, at the reading angle there is almost no specular reflection, giving a glare-free coated paper. The paper gives readings on the Ingersoll Glarimeter much lower than those ordinarily associated with dull papers.

In spite of this characteristic, the clay can be used in considerable proportions in coating formulas for glossy papers, where it improves the color and ink receptivity and materially lessens the tendency of the sheet to blacken during calendering.

As time goes on this new product may be found to have a much wider application and to offer previously unforeseen possibilities.

### Filler Retention

During the past few years a considerable amount of work has been done regarding the mechanism of filler retention. There is no point in listing all of the papers published, but I am sure that all of us remember the interesting micrographic study of the pigmentation of a fiber presented before this group a year ago by Dr. Steele *(2)*. Dr. Steele dealt only with zinc pigments. In a paper presented before this group the previous year, Mr. Willets *(4)*, after a study of titanium fillers, concluded that chemical, mechanical, and colloidal factors were all involved in the mechanism of retention. During the past year a group of papers dealing with the loading of paper have been published by W. Brecht and H. Pfretzschner *(1)* in Germany. They studied a variety of fillers, including clay, and through the use of an entirely different technique from that of Steele have arrived at much the same conclusion, namely, that the retention is the combined results of no less than four different reactions:

1. Filtration, which is responsible for the catching in the sheet of the larger particles.
2. Adsorption on the fibers of fine particles.
3. Diffusion of fine particles into the fiber.
4. Occlusion and fixation in the sheet by the rosin and aluminum hydrate flocs formed in the sizing operation.

They draw a set of curves such as those in Fig. 1 to represent the retention clays of different particle sizes.

This would indicate that in their opinion particles of intermediate size would show the greatest retention. Actually, of course, even the fractionated clays contain particles of all sizes over usually quite a considerable range.

One type of investigation which has not, I believe, been used, and which should be of considerable value in studying this problem would be a comparison of the particle size distribution of a clay obtained from the white water with the same clay in its original condition.

Roschier *(3)* some years ago, investigated the retention of clay very thoroughly. In one of his experiments he prepared by elutriation four particle-size fractions of a clay and determined the retention of each under various conditions. Table I summarizes Roschier's results.

These results are well worth consideration. In the case of the unsized pulp, with no alum, the retention is

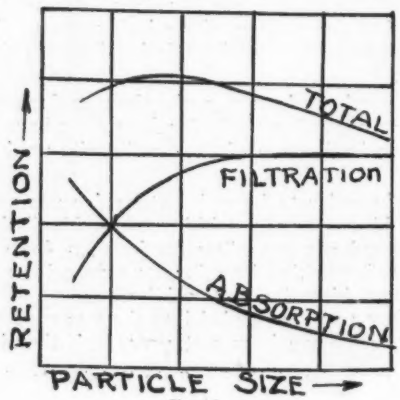


FIG. 1

TABLE I

| | Particle Size Range | | | | Alum | |
|---|---|---|---|---|---|---|
| | 5u | 5-12u | 12-20u | 20-44u | Per cent | |
| Retention | 8 | 15 | 25 | 32 | 0 | Unbeaten and unsized |
| | 36 | 34 | 47 | 54 | 2 | |
| | 28 | 32 | 39 | 42 | 0.84 | Unbeaten; sized with 2.3% rosin |
| | 38 | 41 | 49 | 55 | 2.5 | |
| | 71 | 72 | 74 | 76 | 2.5 | Beaten and sized with 2.3% rosin |

probably due predominantly to filtration. The use in such a furnish of alum increases the retention of all sizes, and especially of the fine particles. This is, I suspect, largely the effect of flocculation of the clay. In other words, the fraction finer than 5$\mu$ is sufficiently flocculated by the alum to make the effective size of the particles much larger and thus permit their retention. It is unfortunate that Roschier did not include in his study unsized pulps, with no alum added, but beaten to various degrees, in order that the effect of more compact sheets on the filtration could be seen.

In the final case, with a beaten pulp and both rosin and alum, the retention still increases with increasing particle size, but it is worthy of note that the difference is comparatively slight.

Another series of tests carried out by Roschier showed the effect of increasing the concentration of alum. In this case he added alum in increasing amounts, bringing the pH back to approximately 5.6 in each case. His retention figures are summarized in Table II.

TABLE II

| Alum, per cent | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Retention, per cent | 28 | 33 | 38 | 44 | 47 | 44 | 42 |

These results check in a qualitative way with those reported by Willetts, who obtained maximum retention of titanium dioxide at an alum concentration of 3 per cent, but did not bring the sheets back to constant pH in each case.

Roschier also studied the effect of pH on retention. In this case he made up his furnish and then neutralized part of the alum with dilute caustic soda before adding the clay. Even with the alum, constant pH has a decided effect on retention, as shown in the figures of Table III.

FIG. 2. ×110.

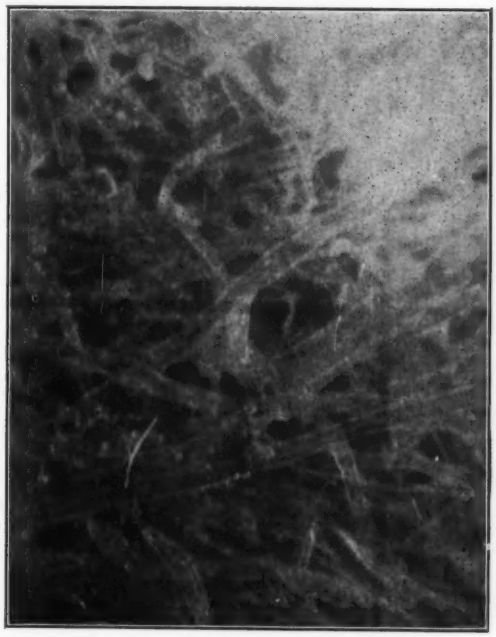

FIG. 3. ×110.

TABLE III

| pH | 4.3 | 4.45 | 4.7 | 5.15 | 5.6 | 6.35 | 6.7 | 7.1 |
|---|---|---|---|---|---|---|---|---|
| Retention | 36 | 38 | 45 | 50 | 52 | 53 | 55 | 51 |

The mechanism of retention is becoming somewhat better understood as the amount of available data increases. Regarding the actual retention obtained under operating conditions, it may be safely said to depend upon pH, amount of rosin, amount of alum, slowness of pulp, nature of pulp, basis weight of sheet, amount of filler added, the temperature of the water, and any number of other factors including in all probability not only the size but also the shape of the filler particles, the electrolytes and perhaps colloidal matter in the water used, etc. It is difficult to think of anything that cannot influence the amount of retention, and needless to say this makes an analysis of work done at different times by different people using different materials very difficult.

### Effect on Paper Properties

Aside from the retention, a number of properties of the paper are influenced to a greater or lesser degree by the clay.

The appearance of the sheet, by which is meant both its brightness and opacity, are of primary importance. The original brightness of the clay is of course the chief factor in determining its effect on the brightness of the sheet. However, the so called "covering power" will also exert some influence on the brightness as well as on the opacity. The covering power depends upon the total surface which in turn depends upon the particle size. If the clay has a higher brightness than the pulp, a fine particle clay, because of its greater covering power, will produce a higher brightness in the sheet than the same amount of a coarser grained clay, although the two clays may have the same brightness. The finer clay will also have more opacifying power.

It is well known that the strength of paper is affected very adversely by the use of fillers. Although some work on this subject has been done, not enough information is yet available to permit the comparison of various clays as to their effect on strength. Here again particle size

as well as particle shape may be found to be of considerable importance.

The printability of a sheet, like the retention of a filler, seems to depend upon a number of factors. A smooth sheet is essential, and here again the fine particle clay is advantageous, since it permits the forming of a smoother surface. The oil absorption of the filler may also have a considerable effect on printability, and other things being equal, it is dependent, like the covering power, upon the particle size distribution.

The ease with which a clay may be used is measured by the difficulties encountered in applying it. A clay which does not slake down readily in water presents such difficulties, for example.

### Blackening of Paper in Calendering

Another operating factor which gives considerable difficulty and which is sometimes blamed upon the clay is the blackening of the paper during calendering. There are very few references to blackening in the literature and we have found no comprehensive discussions of it. We have been anxious for some time to undertake a fairly thorough study of the subject, and while the work is still in the early preliminary stages, it is possible that some of the results so far obtained would be of interest.

The very nature of the change taking place in the paper which results in the blackened appearance is not definitely known. We have taken a few photomicrographs of paper surfaces, using an ultropak illuminator, and these photographs, despite a number of imperfections, show some surface defects in the sheets which may reasonably be associated with blackening.

Fig. 2, is of a badly blackened gumming paper. No sample of the same paper without any blackening was available, and in Fig. 3 it was necessary to use a different paper to obtain an unblackened surface.

It will be noticed that in the first case there is an extremely dark spot in a very great number of the places where visible fibers cross. The visible fibers are of course those nearest the surface. In the case of the less blackened area, the absence of these black intersections is apparent, the only black areas being hollows between fibers.

FIG. 5. ×220.

Fig. 4 shows the surface of a very badly blackened coated sheet. This photograph was taken with the light striking the paper at a very large angle of incidence. The principal apparent defects in the sheet are ridges and humps in the coating, as if the coating had shifted during the calendering.

In Fig. 5 the illumination was the same, but the magnification is much greater. The nature of these rough spots is shown better here. The surface of the sheet resembles a relief map of a mountainous country.

In Figs. 6 and 7 the same blackened sheet was photographed. The illumination was oblique and from only one side. The field is the same in each case, but the

FIG. 4. ×90.

FIG. 6. ×110.

light source was rotated through 120 degrees between the photographs, so that the ridges were illuminated differently. The change in appearance indicates that these defects are undoubtedly minute wrinkles, ridges, etc.

Fig. 8 is a photograph of a coated sheet with very little blackening. In this case as in those described above, the illumination was at a very large angle of incidence, so as to emphasize the relief structure. The photograph shows a great many black spots, but checking back with the relief photo of the blackened sheet shows the difference. The spots on the unblackened sheet appear to be for the most part dirt and incompletely dispersed blue pigment. They are not bordered with high lights like the darkened areas of the blackened sheet, showing that they are more in a plane. The surface is much more free of ridges and valleys.

Fig. 9 is of another badly blackened coated sheet. This photograph was taken with illumination at a large angle of incidence. This photograph shows the same surface defects found in the other badly blackened sheet. In addition, the shadow of several blackened fibers in the rawstock can be clearly seen.

This suggests two possible types of blackening. It is not our purpose, however, to enter into any lengthy discussion of the nature and cause of blackening or of methods to cut down the degree of blackening. The mountainous, cratered appearance of blackened sheets, resembling the surface of the moon, suggests that blackening might be a shadow effect not unlike the "man" in the moon. There is also reason to believe that low brightness or blackened rawstock fibers may show through the coating in some spots.

However, these photographs are presented at the present time only in the hope that they will arouse interest in the subject. It is our desire to apply this method of studying much more thoroughly, and to present our results, if possible, before a later meeting of this association.

In order to make the study worth while, we would like to have a variety of samples of coated and uncoated papers, both blackened and unblackened. We would appreciate receiving any such specimens you may care to submit, together with a description of the paper and any other information regarding it that may be pertinent, such as a notation if the moisture in the sheet when it was calendered was high, etc. We will welcome any cooperation along this line, and hope by combining this type of information with that received from other sources to get a sufficient understanding of the nature and probable causes of blackening to be of some benefit.

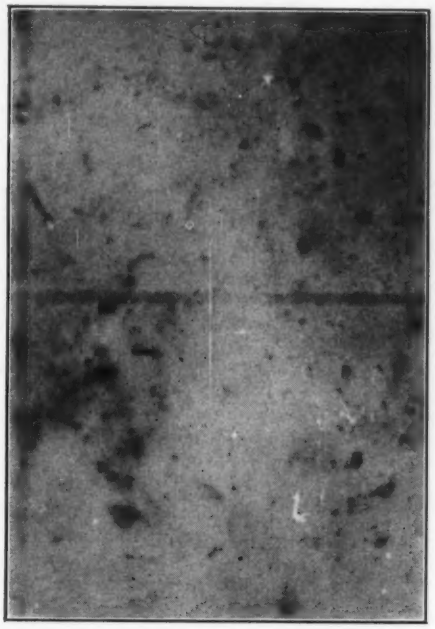

FIG. 8. ×110.

FIG. 7. ×110.

FIG. 9. ×110.

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# An Investigation of Process Variables Using a Miniature Pulp Grinder*

By J. Edwards, G. D. O. Jones, G. J.Potter and H. Wyatt Johnston[1]

**Abstract**

*Further investigations in mechanical pulping using a 2 x 12 inch miniature one-pocket grinder with a swinging pocket loaded by deadweight and reading direct friction drag are described. Dulling cycles were studied for a 46 grit and a 60 grit Norton stone. White spruce with density of 0.36 and 50 per cent moisture content was used to study the effect of speeds from 1600 to 6600 feet per minute and pressures from 50 to 170 lbs./sq. in. pocket upon production, unit energy consumption and pulp properties. The effect of pit consistencies from 2 to 9 per cent and pit temperatures from 140 to 200 deg. F. were also investigated. Speed, temperature and consistency produced little effect upon unit energy consumption and pulp properties. Pressure decreased burst ratio and unit energy consumption and increased freeness and fiber length. Production was proportionate to speed and increased more rapidly with respect to pressure. Thermal balances for the grinding process showed that practically all the energy expended in grinding is converted into sensible heat.*

This investigation was undertaken to ascertain the influence of process variables on the grinding of mechanical pulp with a miniature pulp grinder.

In 1913, J. H. Thickens (*1*) using a 27 x 54 inch three-pocket pulp-grinder investigated the grinding of spruce to produce mechanical pulp and described the effect of grinding pressures from 8 to 40 pounds per square inch of pocket area and stone surface speeds from 1734 to 3470 feet per minute upon production and energy consumption. Lack of present facilities for pulp testing prevent these studies being interpreted in terms of modern practice. J. H. Thickens and G. C. Naughton (*2*) extended this investigation to include a wide range of other species of wood.

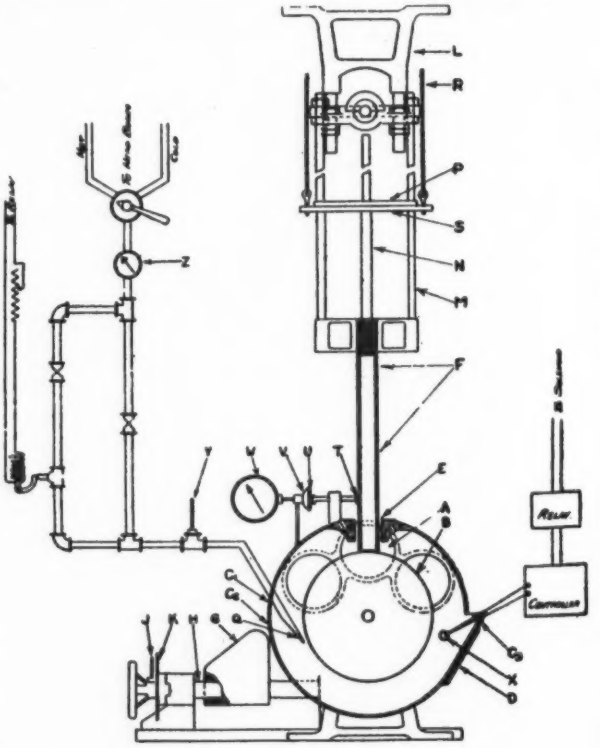
F. Ruehlemann, in 1931 (*3*) measured the changes in temperature taking place within a pulp-stone during grinding. Thermocouples were imbedded in the stone and read at intervals by collector rings on the shaft of a commercial grinder. It was found that the temperature of the stone face at the seat of grinding exerted an important effect on the grinding operation. The view was advanced that water entered the stone near the flanges and flowed out at the periphery.

W. W. Holland, G. D. O. Jones and H. Wyatt Johnston (*4*) using a 15 x 30 inch semi-commercial three-pocket pulp-grinder, studied the influence of grinding pressures from 25 to 50 pounds per square inch of pocket area and stone surface speeds from 3200 to 5600 feet per minute upon the production, energy consumption and pulp properties of mechanical pulp from black spruce and white spruce.

H. B. McAdam (*5*) using a 27 x 54 inch four-pocket grinder at grinding pressure of 30 pounds per square inch of pocket area and surface speeds of 5415 and 6082 feet per minute, ground spruce into mechanical pulp in sufficient quantities to permit experimental runs to be made using a high-speed newsprint paper machine for the purpose. H. W. Johnston and O. Maass (*6*) discussed the manner in which groundwood is produced and the possible role of heat in mechanical pulping and describe a miniature grinder suitable for thermal measurements in grinding pulp.

W. Brecht (*7*) using an experimental grinder at the Darmstadt Technical High School, investigated pulp grinding by the hot and cold processes, employing *pinus insignis*. The effects of grinding pressure, stone speed, pit temperature, pit consistency and orientation of wood upon coefficient of friction, production, energy consumed per unit of production, freeness, bursting strength, breaking length, porosity, smoothness and bulk were observed. The total drag or "grinding number" and the "quality cost" or ratio of unit energy consumption to breaking-length were proposed as criteria of grinding operations. H. W. Johnston and co-workers (*8*) describe the construction and operation of a miniature 2 x 12 inch single-pocket pulp-grinder with deadweight loading and a hinged pocket recording frictional drag directly.

The apparatus has been described in detail by H. W. Johnston and co-workers (*8*) but a brief account will be given for the benefit of those who have not had access to the previous article. Fig. 1 shows a diagrammatic arrangement of the miniature grinder with its principal parts.




Miniature Pulp Grinder

Fig. 1.

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Waldorf-Astoria Hotel, New York, N. Y., Feb. 22-25, 1937.

[1] A contribution from the Pulp and Paper Division, Forest Products Laboratories, Dominion Forest Service, Lands, Parks & Forests Branch, Department of Mines and Resources, Canada.

A 7 hp. induction motor drives a 2 x 12 inch Norton 60 grit pulpstone through a variable speed friction drive. A cast-iron housing with armour-plate glass windows surrounds the stone and forms the grinder pit. A dam adjustable in height and fitted with a detachable spout allows stock to escape. Water can be added either by a fishtail jet in the pit or from stone showers as desired, constant level tanks with temperature regulators and a mixing valve being used to control the temperature of dilution water. A recording temperature controller is used to maintain the stock in the pit at a uniform temperature. The pocket is hinged in gimbals and its drag is measured by a recording pressure gauge. The pocket is 1½ x 1½ inch inside and the plunger is capable of being loaded up to 450 pounds deadweight or 225 pounds per square inch. A hydraulic cylinder is used to lift the plunger to permit the wood supply being replenished. A sturdy carriage permits the accurate application of burrs for stone dressing. Tanks for soaking wood samples prior to use are provided.

During the period when thermal measurements of the heat of grinding were being made the grinder was covered with an asbestos insulating cement and encased in an air-tight jacket of insulating lumber coated with aluminum foil inside and out. Auxiliary heating coils carrying electric current were actuated by Dekhotinsky thermoregulators and motor-driven stirrers used to keep the temperature in the jacket uniform.

**Method of Operating the Grinder**

### Wood Operation

Wood which had been selected for uniformity was cut into billets 1½ inch wide, 1½ inch long and 4 inches high. The billets were sampled for density and moisture and stored in air saturated with water vapor. A planer saw was used for preparing billets. All knots and compression wood were rejected and all billets were rectangular in form.

### Stone Dressing

Steel burrs were used to dress the stone. Diamond burrs and smooth rolls were half the normal width to permit traversing and thus prevent ridges forming on the stone face. Solid cores were used for half-width burrs, being driven snugly home to true up the burr.

### Warming Up

Hot water was used to warm up the stone before grinding followed by refuse wood to bring the stone up to temperature.

### Method of Running

Two operators were required to operate the grinder and take complete readings. The following measurements were made and recorded throughout the run.

(1) Wood rate by weight and by pieces, allowing for variation in size.
(2) Friction drag (recorded).
(3) Temperature of pulp leaving grinder (recorded).
(4) Temperature and volume of inlet water.
(5) Stone speed by counter and tachometer.
(6) Deadweight on pan.
(7) Temperature of pulp leaving pocket or elsewhere as may be required.
(8) Weight and consistency of pulp produced (when necessary).
(9) Grinding time.

### Pulp Characteristics

Representative samples were taken covering each set of conditions to be studied and used to determine consistencies and pulp characteristics. The following pulp properties were determined after the run.

(1) Consistency.
(2) Freeness (Canadian standard).
(3) Drainage factor (Campbell).
(4) Classification (Johnston).
(5) Sheets (British).
(6) Burst ratio (metric).
(7) Tear ratio (metric).
(8) Breaking length.
(9) Bulk (cc. per gram).

Slides were made and stained for microscopic examination. Samples were dewatered and stored in sealpac containers.

### Stone Surface Records

Wax impressions and later plaster casts were made where convenient.

### Computation of Results

The following quantities were computed.

(1) Rate of advance of wood in feet per min. toward stone.
(2) Ratio of rate of advance to stone speed.
(3) Production in units of 100 cu. ft. per sq. ft. of pocket area, per 24 hours.
(4) Friction drag in pounds.
(5) Coefficient of friction.
(6) Horsepower days per unit ground.

**METHOD OF COMPUTING RESULTS**

| Item | Units | Method of Computation<br>Digits before decimal points indicate runs. Digits after decimal points indicate part of runs. |
|---|---|---|
| (1) Experiment Number | | |
| (2) Wood density | g. per cc. | $\frac{\text{O.D. weight of sample}}{\text{Wt. of water displaced by undried sample}}$ |
| (3) Wood moisture | Per cent | $\frac{\text{Undried wt. of sample—o.d. wt. of sample}}{\text{Undried weight of sample}}$ |
| (4) Stone speed | Feet per min. | R.p.m. × π × stone diameter in feet. |
| (5) Pocket pressure | Pounds per sq. in. of pocket area | $\frac{\text{Total dead weight on pan}}{\text{Cross-sectional area of billet in sq. in.}}$ |
| (6) Pit temperature | Deg. F. | |
| (7) Pit consistency | Per cent | $\frac{\text{O.D. weight of sample} \times 100}{\text{Undried weight of sample}}$ |
| (8) Rate of advance | Feet per min. | $\frac{\text{Length of billets in feet}}{\text{Grinding time in minutes}}$ |
| (9) Friction drag | Pounds | Comparison of gauge reading with values for dead weight |
| (10) Age of surface | Hours | Grinding time in hours after dressing stone |
| (11) Feed/speed ratio × $10^5$ | Ratio | $\frac{(8)}{(4)} \times 10^5$ |
| (12) Coefficient of friction | Ratio | $\frac{(9)}{(5) \times \text{cross-sectional area of billets in sq. in.}}$ |
| (13) B.h.p. at stone face | H.p. at stone face | $\frac{(9) \times (4)}{33{,}000}$ |
| (14) Daily production | 100 cu. ft. solid wood per sq. ft. pocket area per 24 hrs. | $\frac{(8) \times 1440}{100}$ |
| (15) H.p. days per unit | H.p. days per 100 cu. ft. solid wood | $\frac{(13) \times 144}{(14) \times \text{cross-sectional area of billets in sq. in.}}$ |
| (16) Freeness, Canadian Standard | Cc. | Canadian standard method |
| (17) Drainage factor | Seconds per gram | Standard drainage factor |
| (18) Bulk | Cc. per gram | $\frac{\text{Sheet thickness in mm.}}{\text{Basis wt. in grams per sq. meter}}$ |
| (19) Burst ratio | Ratio | $\frac{\text{Mullen in gms./cm.}^2}{\text{Basis wt. in gms./M}^2} = \frac{\text{Mullen in gms./cm.}^2}{0.5 \times \text{lb./sq. in. Mullen}}$ |
| (20) Paterson number | Ratio | Equivalent burst ratio at 100 freeness |
| (21) Breaking length | Meters | $\frac{\text{Tensile strength kilos/1.5 cm. width} \times 200{,}000}{3 \times \text{basis weight, lb./ream}} = \frac{\text{Tensile strength kilos/1.5 cm. width} \times 200{,}000}{47410 \times \text{basis weight, lb./ream}}$ |
| (22) Tear ratio × 100 | $\frac{\text{gms.} \times 100}{\text{gms.} \times \text{M}^2}$ | $\frac{\text{Basis wt., lb./ream 25x40—500}}{\text{gms. Elmendorf} \times 100} = \frac{\text{gms. Elmendorf} \times 100}{\text{Basis wt. in gms./M}^2} = \frac{\text{gms. Elmendorf} \times 100}{0.7115 \times \text{gms. Elmendorf} \times 100}$ |
| (23) Per cent stretch | Ratio | Pounds per ream 25x40—500 |
| (24) Fiber analyses | Per cent by weight between various screens | Per cent retained above a 28 mesh Tyler screen<br>Per cent between 28 and 200 mesh<br>Per cent passing 200 mesh (Johnston fiber classifier) |
| (25) Per cent screen | Per cent by weight | Per cent grinder stock retained above a 0.010 in. screen plate, less weight of slabs. |

**Experimental Results**

The experimental results obtained have been plotted under the following headings.

Figures 2A, 2B, 3A, 3B, 8A and 8B, Effect of age of stone surface.
Figures 4A, 4B and 9A, Effect of pit consistency.
Figures 5A, 5B and 9B, Effect of pit temperature.
Figures 6A, 6B and 10A, Effect of grinding pressure.
Figures 7A, 7B and 10B, Effect of grinding speed. Thermal balance.

The results of trial experiments have been omitted to keep the record simple. Experiments giving anomalous results have not been included unless confirmed on repetition.

## Effect of Age of Stone Surface

Two series of experiments were conducted to ascertain the effect of stone wear upon production, energy consumption and pulp properties. The first series was carried out using a 46 grit Norton pulpstone and the second using a 60 grit Norton pulpstone. The results obtained from the second series are much more extensive and have been shown graphically in figures 3A, 3B, and 8B.

The results of the first series are shown graphically in Figs. 2A, 2B and 8A.

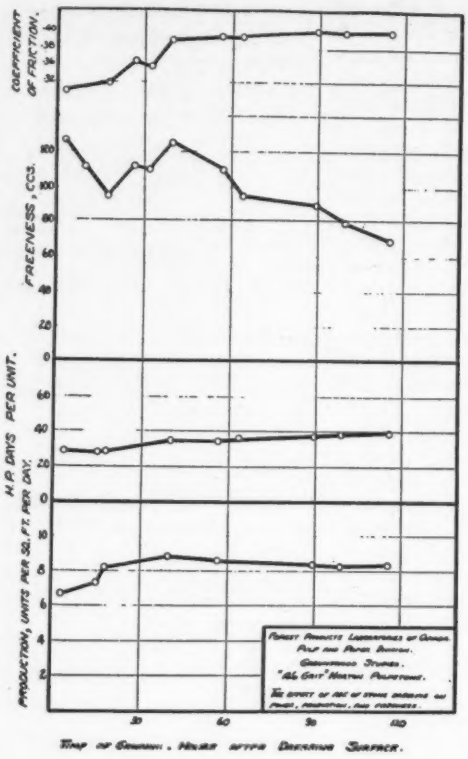

COEFFICIENT OF FRICTION.
FREENESS, CCS.
H.P. DAYS PER UNIT.
PRODUCTION, UNITS PER 30 LB. FF. PER DAY.
Time of Grinding, Hours after Dressing Surface.

Fig. 2A.

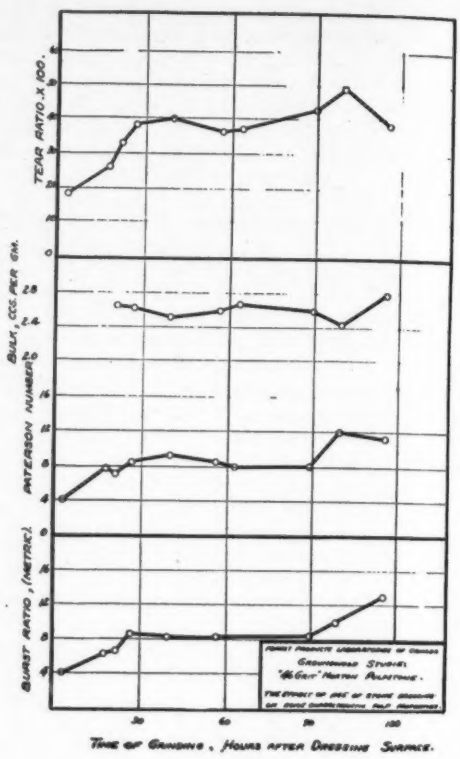



Fig. 2B.

It will be observed that there is a definite period of induction during which the stone surface is becoming stabilized. Presumably the grits loosened in dressing are detached and removed by wear. It is interesting to note that the surface alters so that when stroked with the figures against the direction of motion the ridges feel smoother than when stroked with the motion of the stone. The 46-grit stone was reversed in its mounting and it was found that the rate of production, energy consumption and pulp properties reverted to a condition closely resembling that which obtained immediately after the stone was dressed. This is an interesting confirmation of the experience of practical operators that a newly sharpened artificial stone, especially if sharpened for the first time, requires a period of use before a satisfactory grinding condition can be obtained.

Reference to Fig. 3A will show that as the stone surface ages through wear the rate of production falls and the unit energy consumption rises, tending toward constant values. Little change

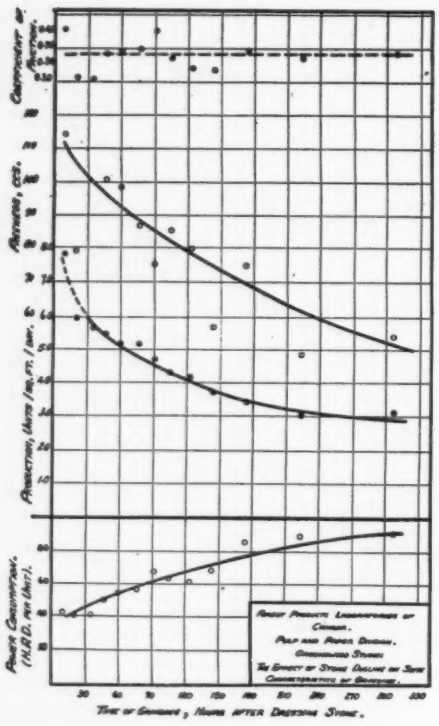

Coefficient of Friction.
Freeness, CCS.
Production, Units / 30 Ft. F. / Day.
Power Consumption, (H.P.D. per Unit).
Time of Grinding, Hours after Dressing Stone.

Fig. 3A.

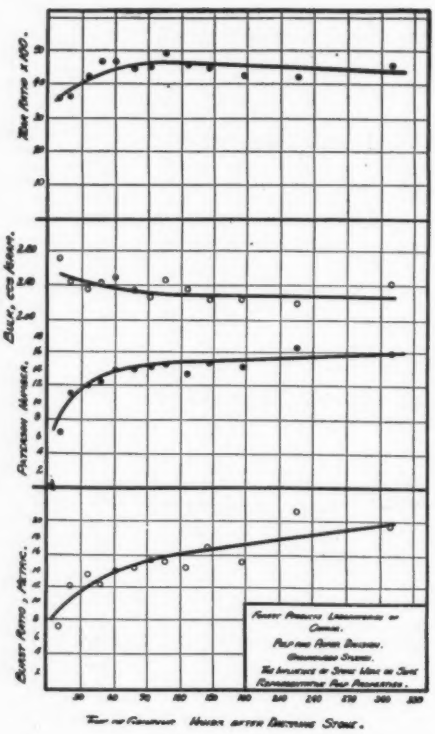



Fig. 3B.

takes place in the coefficient of friction. The pulp properties undergo progressive changes, the freeness decreasing and the burst ratio rising. The Paterson number, or equivalent burst at 100 freeness, tends to a constant value. Bulk and tear likewise tend to constant values. The retention above 28 mesh, (Fig. 8B) tends to rise to a maximum of later decreases, while the past 200 fraction similarly passes through a minimum and then increases.

### Effect of Pit Consistency

The effect of pit consistency is shown in Figs. 4A, 4B and 9A. All of these results were obtained with a 60-grit Norton stone. The properties of the pulp were only changing very slowly with increasing age of the surface, which had then been used for about 300 hours It will be observed that over the range 2.0 to 6.0 per cent the effect of changes upon production, energy consumption and pulp properties is slight. The ends of the curves show a tendency toward decreased production, increased energy consumption, and decreases in burst ratio, freeness and Paterson number. Retention on 28-mesh appears to fall off at low and high consistencies. It seems fair to observe that difficulty was experienced in keeping stone immersion uniform at low consistencies, an extension spout being necessary for the purpose. At high consistencies the small dimensions of the pit necessitated raking to keep the pulp in circulation. It was found that if the stone surface was not kept properly immersed production, freeness and strength fell off and energy consumption rose, presumably owing to a tendency toward overheating of the stone surface. It is, therefore, not possible to ascribe a definite trend to the influence of consistency on production or pulp properties in the absence of further investigation. It may be observed that these changes in consistency have been con-

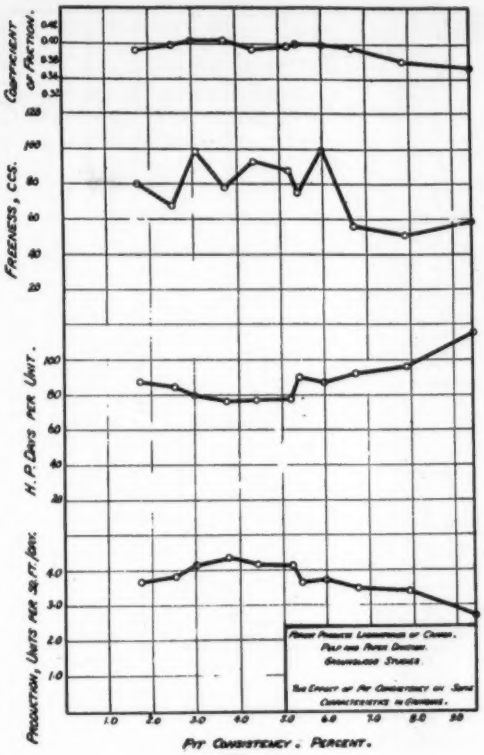



Fig. 4A.

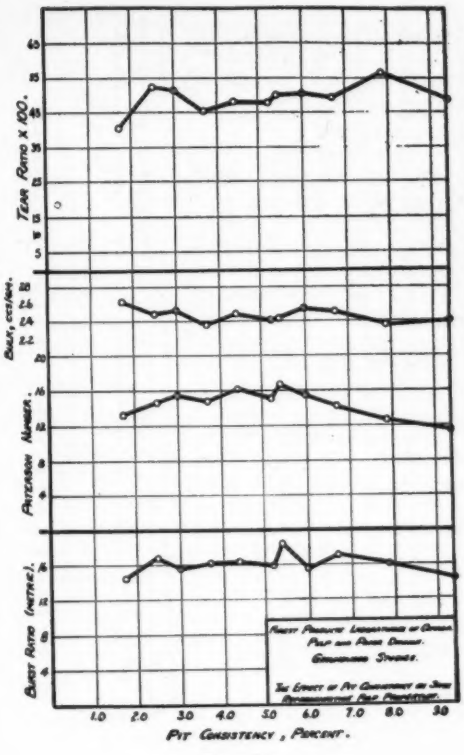



Fig. 4B.

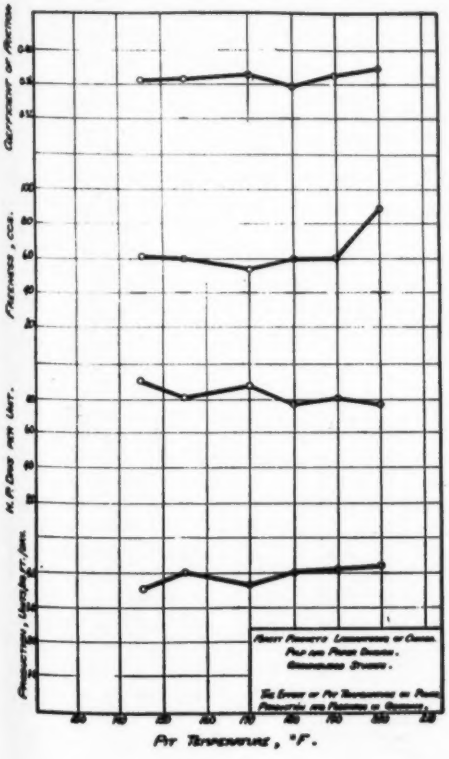



Fig. 5A.

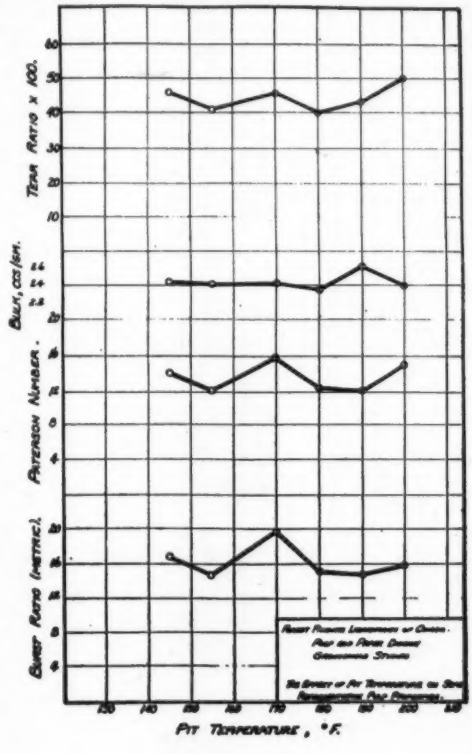



Fig. 5B.

ducted at a constant pit temperature by the use of feed water at appropriate temperatures.

### Effect of Pit Temperatures

The effect of pit temperatures at about 5 per cent consistency is shown in Figs. 5A, 5B and 9B. It is evident that over the range of temperature studied there is but little effect upon production, energy consumption or pulp properties, although slight tendencies towards progressive change can be detected. Adequate immersion of the stone was maintained throughout. Lower temperatures could not be reached at the consistency selected unless cooling of the stock in the pit was provided.

### The Effect of Dam Height

No direct series of experiments on dam height was undertaken because the range separating inadequate immersion from adequate immersion was found to be so small as to be critical. It was observed that the effect of consistency might be masked by absence of proper immersion or by the free circulation of stock being prevented.

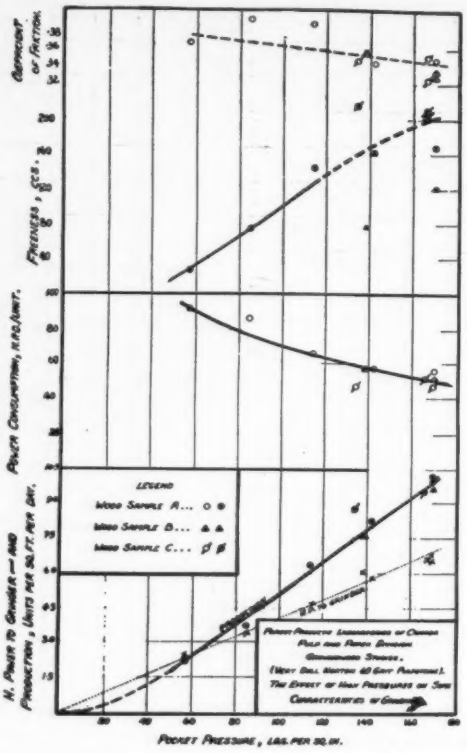



Fig. 6A.

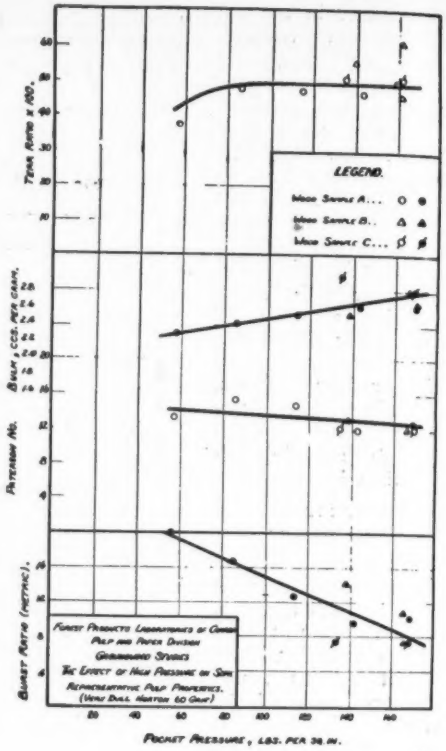



Fig. 6B.

### The Effect of Pressure

The effect of pressure is shown in Figs. 6A, 6B and 10A. It will be noticed that the lowest pressure employed was 50 pounds per square inch, normally a high grinding pressure according to commercial practice. The reason is that the stone was now very dull and at lower pressures produced only slow pulps at a very low rate of grinding. It will be noticed that horsepower to grinder increases directly as pressure while the production curve rises more steeply. Freeness increases and burst ratio decreases with increasing pressure, the change accompanied by an increase in fiber length. Unit energy consumption decreases with increasing pressure, while the coefficient of friction does not appear to be affected.

### The Effect of Speed

The effect of speed upon production, energy consumption and pulp properties is shown in Figs. 7A, 7B and 10B. It will be noticed that so far as production and energy consumption are concerned the findings of H.

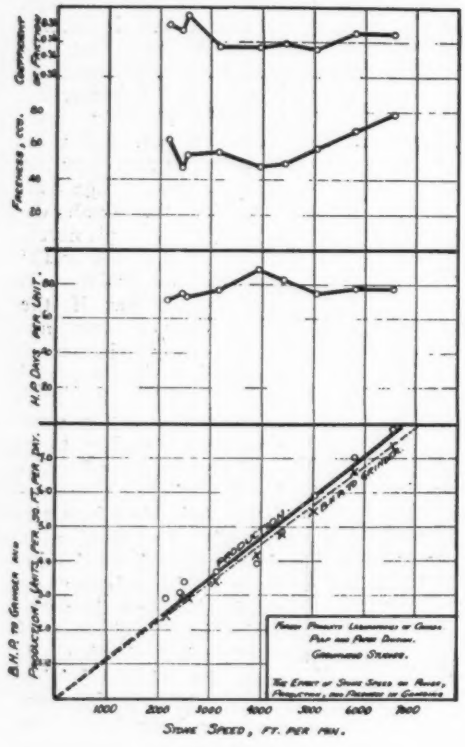



Fig. 7A.

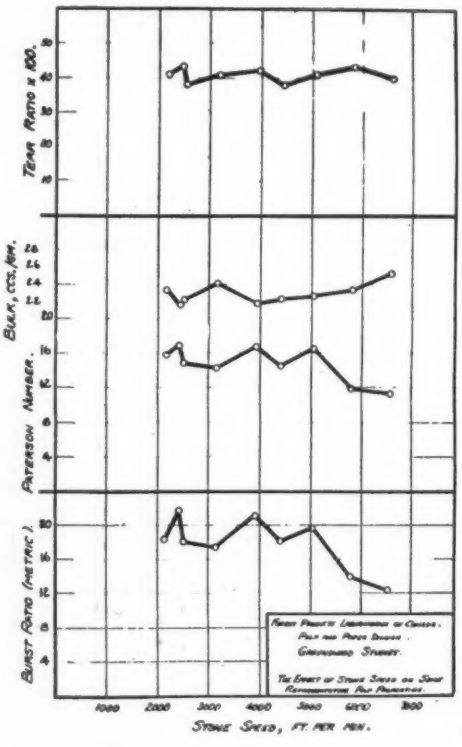



Fig. 7B.

W. Johnston and coworkers (*4*) are confirmed. Production and horsepower to grinder appear to be directly proportional to stone speed, and energy consumption is therefore constant. The smoothed curves for production and power to grinder are used to calculate the unit energy consumption. From 2000 to 5000 feet per minute no noticeable trend can be observed in pulp properties, but from 5000 to 6600 feet per minute there is an apparent rise in freeness accompanied by decreases in burst ratio and Paterson number. Classification is not much affected below 6000 feet per minute but a decreased retention on the 28-mesh is recorded above that value.

It is worth noting that at the highest speeds employed considerable difficulty was experienced in keeping the pulp from flying off the stone owing to centrifugal force, and also that the last results at high speed are not part of the first series. It is therefore not possible to state in the absence of further work what the trend of pulp properties will be at the highest speeds.

### Discussion of Results

It is of interest in discussing the results obtained to compare them with the results of previous investigations. The principal investigations available for comparison are as under:—

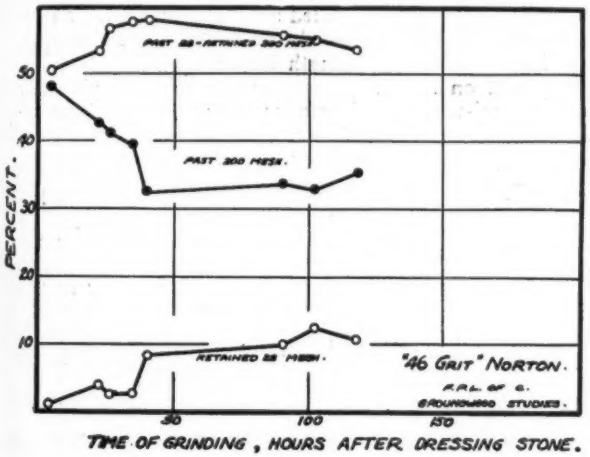

PAST 28 — RETAINED 200 MESH.
PAST 200 MESH.
RETAINED 28 MESH.
"46 GRIT" NORTON.
F.P.L. OF C. GROUNDWOOD STUDIES.
PERCENT.
TIME OF GRINDING, HOURS AFTER DRESSING STONE.

FIG. 8A.

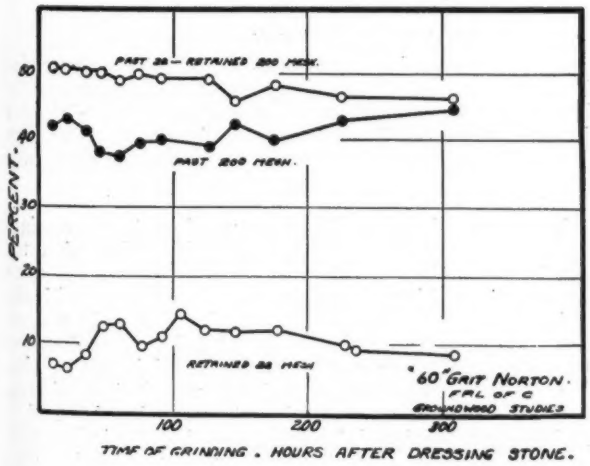

PAST 28 — RETAINED 200 MESH.
PAST 200 MESH.
RETAINED 28 MESH.
"60" GRIT NORTON.
F.P.L. OF C. GROUNDWOOD STUDIES.
PERCENT.
TIME OF GRINDING . HOURS AFTER DRESSING STONE.

FIG. 8B.

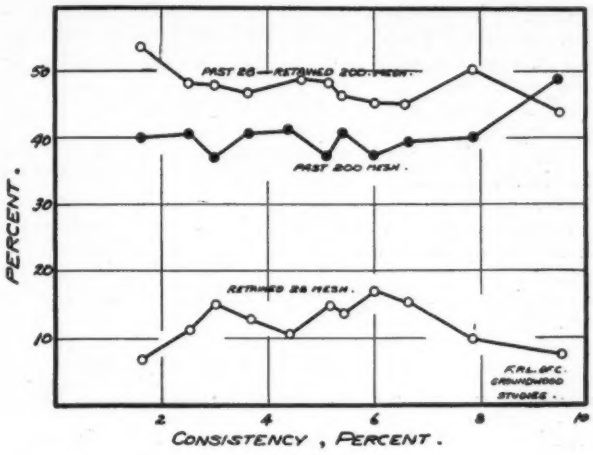



FIG. 9A.

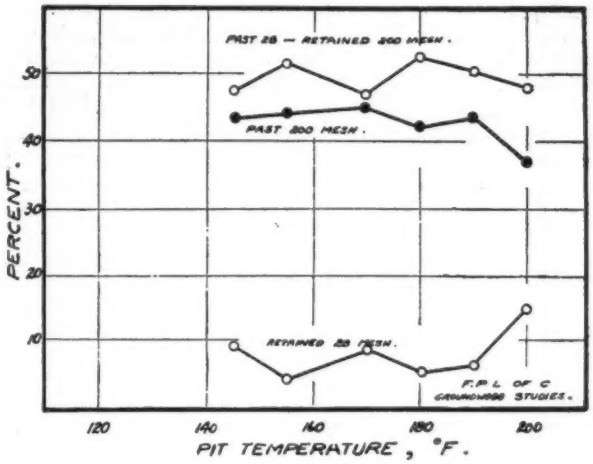



FIG. 9B.

| Place | Date Reported | Investigator |
|---|---|---|
| (1) U. S. Forest Products Labs., Madison, Wis. | 1913 | J. H. Thickens |
| (2) Forest Products Labs. of Can., Montreal, Que. | 1935 | H. W. Johnston and co-workers |
| (3) Ontario Paper Company, Thorold, Ont. | 1935 | H. B. McAdam |
| (4) Pulp and Paper Institute, Technical High School, Darmstadt, Germany | 1935 | W. Brecht and co-workers |

Of these investigations (*1*) is in substantial agreement with the present results so far as production and energy relations are concerned, but developments in pulp evaluation since 1913 render the comparison of pulp properties in relation to process variables impracticable.

The work done in (*2*) so far as it goes is in general agreement with the present results so far as production, energy relations and pulp properties are concerned. It is to be regretted that steps were not taken to follow the dulling cycle during the earlier work and that it was not possible to grind enough wood to eliminate the effects of wood variations. No temperature or consistency studies were made; in fact the present work was undertaken so that a larger field could be covered more economically. It will be sufficient to remark that both investigations agree in providing indications that increases in speed do not affect energy consumption or pulp properties to any marked ex-

tent, while increases in pressure decrease energy consumption and bursting strength and increase freeness and fibre length, always assuming that the stone face remains sensibly unchanged during the operation and has passed beyond the unstable phase immediately following a stone dressing.

The principal conclusions to be drawn from (*3*) are that in the experiments conducted at Thorold the average fiber length appeared to be decreased by the increase in speed when carried out on a mill scale. This result is not in accordance with the results either of (*2*) or of the present investigation and it is desirable that further investigations be conducted to determine the cause for the lack of agreement.

The work of Brecht at Darmstadt (*4*) is of interest because it agrees neither with Thickens (*1*), Johnston (*2*), McAdam (*3*) or the present work. Broadly speaking Brecht finds that variations in grinding pressure have but little influence on energy consumption but increasing pressure results in producing large quantities of pulps which are freer, somewhat weaker and have less fines. Speed variations Brecht finds to have much more marked effects than pressure changes, increases in speed resulting in marked decreases in energy consumption, strength and fines and corresponding increases in freeness. In addition to these points of difference Brecht finds that increases of pit temperature increase strength and energy consumption while increases of consistency produce the opposite effect, especially in grinding at low temperatures. No explanation is offered of the divergence in findings; the only comments which can be made are that Brecht worked with Scotch pine, or *pinis insignis*, with only 16 per cent moisture content while most of the other investigations are based on white spruce, or *picea glauca*, with moisture contents of 40 to 50 per cent. Brecht used natural sandstones and in some cases artificial stones with a cement matrix. He does not state how the effects of dulling are taken into account. There is therefore no reason why these divergencies in findings may not ultimately be reconciled but further work will be necessary.

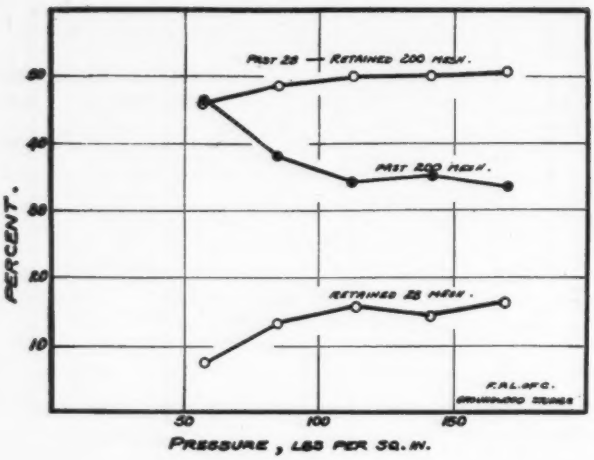



FIG. 10A.

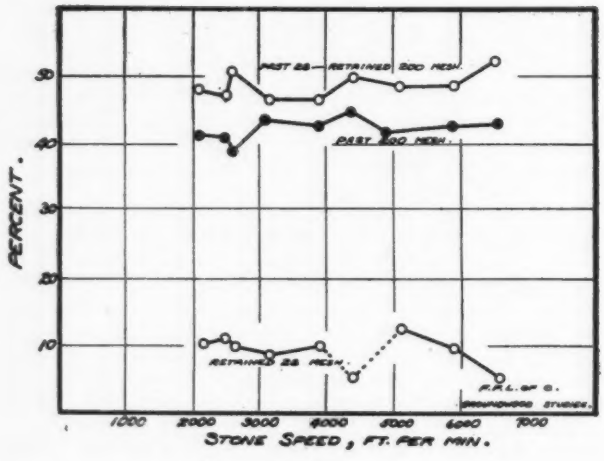



FIG. 10B.

### DULLING CYCLE

It is interesting to note that owing to the reduced wear the dulling cycle is prolonged beyond normal lengths thus permitting studies of the effect of varying pressure, speed, pit temperature and consistency on a comparable basis. It is also interesting to note that pulps exactly similar to commercial pulps were produced once the period of induction was over. It appears as if grits loosened in sharpening are removed and the advancing edges of lands or ridges thus altered in form so as to permit better removal of fibers. A freshly sharpened surface yielded only fine chopped flour incapable of forming a sheet of normal weight. As the surface dulled burst ratio rose, fiber length increased and with it rose the freeness. On further dulling freeness and fiber length began to decline but burst ratio went on rising. Previous work with 46-grit stones in the semi-commercial grinder suggests that there may be differences between different stones in this respect.

### PRESSURE

It will be noted that production tends to zero at pressures greater than zero, suggesting a minimum pressure being required to remove fibers using a dull stone face. Above these minima it appears that both production and power to grinder are related in a linear manner to pressure, so that increased pressure will always result in decreased energy consumption per unit of production, but grinders would have to be made stronger and heavier in at least the same proportion.

### SPEED

It appears of interest to ascertain whether the decreased strength and increased freeness at the highest speed so far attained is a definite trend or whether the apparent independence of speed, energy consumption and pulp properties at lower speeds can be extended.

### TEMPERATURE AND CONSISTENCY

The results obtained so far suggest that the real variable is the temperature of the stone face and that the governing factor is adequate immersion. The use of a shower just where the wood meets the stone has enabled grinding at still higher consistencies to be carried out successfully.

### ZONE OF CONTACT BETWEEN WOOD AND STONE

The zone of contact between wood and stone might be studied further to advantage. It is evident that the consistency and temperature of stock leaving the contact zone are both higher than the stock carried up with the rising face. It is interesting to notice that pulp properties and energy consumption appear to be about the same whether the 1½ inch of contact on the miniature grinder, the 7½ inches of contact on the 15 x 30 inch semi-commercial grinder or commercial pockets ranging from 15 to 53 inches are employed. This suggests that regrinding does not take place, in spite of Brecht's results which indicates that increasing length of grinding zone gives stronger and

TABLE I—MEASUREMENT OF HEAT—POWER RELATIONSHIPS IN GRINDING

| Experiment No. | Wood Density | Wood Moisture per cent | Pocket Pressure lb. per sq. in. | Stone Speed ft. per min. | Friction Drag pounds | Rate of Advance (grams per minute) | Stock Temperature deg. C. | Stock Consistency per cent | Inlet Water Temperature, deg. C. | Inlet Water in grams per minute | Wood Temperature deg. C. | Horsepower to Grinder, kgm. cal. | Heat Equivalent of Power to Grinder kgm. cal. | Heat Gained per min. by Inlet Water kgm. cal. | Heat Gained per min. by Water in Wood kgm. cal. | Heat Gained per min. by Fibers | Total Heat Gained per min., Kgm. cals. | Per cent Recovery of Power as Heat | Water Balance, Inlet vs. Consistency per cent | Paterson Number of Stock |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 142.01 | .376 | 48.9 | 56.2 | 3500 | 32.7 | 83.6 | 69.0 | 2.60 | 48.0 | 1564* | 21.0 | 3.47 | 37.10 | 32.88 | 1.98 | 0.86 | 35.72 | 96.4 | ... | ... |
| 142.03 | .376 | 49.0 | 56.2 | 3550 | 33.0 | 87.0 | 54.5 | 3.10 | 26.5 | 1315* | 21.0 | 3.55 | 37.92 | 35.60 | 1.43 | 0.62 | 37.65 | 99.3 | ... | ... |
| 142.04 | .376 | 56.5 | 54.6 | 3580 | 33.2 | 82.0 | 42.0 | 1.755 | 24.0 | 2000 | 22.0 | 3.52 | 37.66 | 36.00 | 0.92 | 0.30 | 37.20 | 98.8 | 97.2 | 15.2 |
| 142.05 | .376 | 56.5 | 54.6 | 3450 | 32.8 | 84.1 | 60.3 | 1.81 | 41.5 | 2000 | 22.0 | 3.43 | 36.65 | 37.60 | 1.84 | 0.60 | 40.04 | 109.4 | 97.0 | 15.6 |
| 142.06 | .376 | 52.0 | 54.6 | 3575 | 33.8 | 50.6 | 41.0 | 1.79 | 19.1 | 1355 | 20.0 | 3.66 | 39.18 | 29.70 | 0.53 | 0.20 | 30.43 | 77.8 | 95.9 | ... |
| 142.07 | .376 | 56.0 | 54.6 | 3500 | 33.5 | 80.4 | 56.5 | 2.60 | 32.6 | 1450 | 21.0 | 3.55 | 37.98 | 34.65 | 1.49 | 0.57 | 36.71 | 96.7 | 96.9 | ... |
| 142.04, based on consistency | | | | | | ... | ... | 1.755 | ... | .... | ... | ... | 37.66 | 35.00 | 0.92 | 0.30 | 36.20 | 96.3 | 97.2 | ... |
| 142.05, based on consistency | | | | | | ... | ... | 1.81 | ... | .... | ... | ... | 36.65 | 36.42 | 1.84 | 0.60 | 38.86 | 106.3 | 97.0 | ... |

* Note: In 142.01 and 142.03 the inlet water was obtained from the consistency only.

slower and finer pulp. Rough calculations indicate that on an average several inches of the dull stone face may pass over a fiber before it is completely removed, but that fibers possibly are partially loosened and swung into the general direction of motion permitting a type of refining or beating action to occur. A very sharp face cuts the fibers in situ in a series of parallel tracks, thus giving rise to flour and chop. Reversing a partly dull stone has a similar effect. Further study on this line would give a better insight into the mechanism of fiber removal. Definite evidence as to the maximum temperature to which fibers are subjected and to what extent softening precedes or aids fiber removal is still lacking. Absence of lubrication from showers or pulp carried up from the pit leads to decreased production, fiber length, freeness and strength.

### Coefficient of Friction

No well marked trends of variation in coefficient of friction were observed after the stone face passed the initial phase of instability, but it was noticed that the miniature grinder with its 1½ inch grinding zone exhibited a higher coefficient of friction (about 0.33 to 0.38) than in the 15 x 30 inch semi-commercial grinder which gave a value of about 0.22. Still lower results, ranging from 0.13 to 0.16 have been reported from some commercial pocket grinders. Since the production of a definite type of pulp requires approximately the same unit energy consumption it follows that the production from unit area is higher in the case of the smaller grinding zones. Further work on these lines might prove of value.

### Energy Expended in Grinding

It is interesting to note that the average of the thermal balances obtained from the miniature grinder appears to justify the opinion expressed by W. B. Campbell (*9*) that practically all of the energy expended in grinding reappears in sensible heat.

The energy expended in producing a pulp of definite characteristics from a given species of wood of given moisture content appears to be sensibly constant, although there is some indication that the use of high pressures and dull stone faces in combination may result in less energy being necessary. It is probable that the use of means other than pulp grinders may be the most likely direction in which to seek for further reductions in energy consumption or unusual combinations of pulp properties. Density of species plays an important part, but the specific characteristics of species themselves together with moisture content are still more important.

(1) The miniature 2 x 12 inch pulp grinder with a 1½ x 1½ inch pocket has proved capable of producing pulps of commercial grades in such a manner that the influence of wood species and condition in relation to the variables of the grinding process can be studied on a basis comparable with commercial practice.

(2) It has been shown with reasonable certainy that almost all the energy consumed in grinding pulp is converted into sensible heat.

(3) Within the limits imposed by the nature of the grinder variations of speed, pit temperature and pit consistency exert little influence on unit energy consumption and pulp properties. The production appears to increase in direct proportion to the speed.

(4) Pressure increases result in decreased unit energy consumption and bursting strength and in increased production, freeness and fiber length.

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(3) Ruehlemann, Fritz, "Temperature Measurement in the Grinder Stone," *Papierfabr.* 29, No. 29:461 (1931). Translation by B. A. Hoskinnen and H. A. Paterson.
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# A Quantitative Test for Soap Wrap Paper*

By T. Linsey Crossley[1]

Customary tests for the fitness of paper for soap wrapping have been either to place the paper in question between freshly cut surfaces of the soap to be wrapped, or to spot it with drops of caustic soda solution. The result of neither of these tests is capable of numerical expression. The contact test requires time and does not give uniform results, depending on the moisture present and degree of sweating. The drop test is either too drastic, or varies

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with the degree of sizing and thickness of the paper. Few soaps carry free caustic soda, and that only in very low percentages, while paper is expected to show no discoloration when drops of solutions containing up to four per cent caustic soda are allowed to dry out on its surface.

The actual impurity in paper that becomes stained by soap or alkali has not been clearly identified, but a research student of the department of chemistry in the University of Toronto *(1)* identifies carboxylic cello-dextrin as at least one of the substances discoloring with alkali, in addition to lignin.

The substance or substances that react with alkali to cause staining of paper are soluble in water, and upon adding caustic soda to the decoction, the color or tint is darkened. This effect is removed on acidifying, suggesting some form of tannin. In one or two cases trace of ferrotannin reaction has been noted in the marginal stain. Further, the tint becomes lighter on exposure to sunlight.

### A Colorimetric Test

Based on the observations above, a colorimetric test has been developed which has application to a wider range of paper than the drop test, and is capable of giving similar results by different operators.

#### Reagents

Bichromate of potassium 0.25 grams per liter. Congo red, 1 per cent (Eastman Kodak, E. K. 770), normal caustic soda.

#### Apparatus

Six nessler jars, marked at 50 cc. Thin colorless walls 1-mm. thick, diameter 29-30 mm., the 50 cc. mark to be about 90 mm. from the bottom outside. 1-cc. pipette, graduated to 0.01 cc.

#### Procedure

Tear 3 grams of the paper into pieces ¼ to ½ inch square, and put into a 250-cc. Erlenmeyer flask.

Add 50 cc. of hot water to the paper in the flask and boil for five minutes.

The decoction is decanted off the paper into a 100-cc. flask or graduated cylinder.

Add 50 cc. hot water to the paper in the flask and boil again for five minutes.

The second lot is added to the first, and made up to 100 cc., using the make-up water to wash the paper in the flask.

Add 25 cc. of normal caustic soda to the combined decoctions and, after standing for five or more minutes, filter, using a fast filter paper if the insoluble matter is flocky, or a close filter if it appears cloudy.

The filtrate which must be quite clear, is now ready for comparison.

To 50 cc. of the bichromate add 0.1 cc. of the congo red. After mixing this well, place 0.2, 0.5, and 1.00 cc. in three nessler jars, filling them to the mark with water.

Put 50 cc. of the decoction into another nessler and adjust the color standards to the nearest match.

#### Results

State results as quantity of bichromate-congo red required to match tint of decoction, expressed as cc.

It has been our experience that papers requiring more than 3 cc. will give a marked stain with 1.0 per cent caustic soda in the drop test.

The test outlined above has been made on a number of plain, white, sized and unsized papers, vegetable parchment, waxed papers, and kraft separators.

With sized papers we have worked both with and without removing the size (rosin). Moderately sized papers give very nearly the same results before and after removing the size with methyl hydrate, but with some very hard sized paper, the results were from 50 to 80 per cent higher after removal of size. From these results we came to the conclusion that rosin size has little or no effect on the staining of soap wrappers.

With vegetable parchment a finer subdivision of the sample is advisable, but we have usually had low figures on these papers, 2 cc. or less.

Waxed papers give trouble if the wax is not first completely removed by extraction in a soxhlet tube. The decoction is likely to be cloudy. In one such case we obtained fair results without extracting the wax, by chilling the decoction after adding the soda, and before filtering.

Exact matches of tint are not always possible, but distinction is readily seen in intensity.

The reason for adding the red only at the time of making the test is that the bichromate destroys it slowly, so the matching solution is only good for a few hours, and the comparates behave in the same way. We have not been able to find a red that retains its shade in bichromate solution. Bichromate itself is so stable and readily available that we have felt it to be best for the purpose, and its tint is very near to that developed by the effect of soda on the paper decoction.

We find that shades are best compared by holding the comparates over white paper, but not resting on it, and looking down the inside of the tube.

If a third extraction by boiling for five minutes be made, with some papers there will be a further effect upon adding soda, but this has not, as far as we have gone, been enough to require a change in the class of paper, and since it dilutes the shades of the previous extracts, we decided to make an arbitrary time limit.

### Literature Cited

(1) Keating, W. R., "Discoloration of Soap Wrap Paper." Thesis presented as part requirement for degree B.Sc., Univ. of Toronto, Toronto, Ont.

## Report of Committee on Soap Wrap Paper

Your committee recommends to the industry that the colorimetric method of evaluating soap wrap papers, previously outlined by this committee, and presented in detail in a paper at this meeting, be accepted as a tentative standard.

Further, if such action be taken, that the American Oil Chemists' Society be so advised, through its Committee on Paper and Ink. This committee under the chairmanship of L. F. Hoyt, of the Larkin Company, has given valuable suggestions and cooperation.

We acknowledge the excellent work of W. J. Keating, a research student of the University of Toronto, who studied at our suggestion the causes of staining of paper by caustic alkali, and wrote a thesis which we trust it will be found possible to publish by courtesy of the University.

Substances in paper found to be stained by caustic alkali are lignin, carboxylic cello-dextrin and tannins. Rosin and resinates present from size have not been found to be deleterious.

Suggestions for improving quality of papers in this respect are (1) Clean pulps; all water soluble residues should be removed as much as possible. If old papers are used, washing should be finished with warm water. (2) Bales or laps at the bottoms of piles should not be used. Keep pulp away from beater room floors or wet wood. Use dry skids. (3) Run with clean machine clothing. (4) Avoid over-drying on the machine or any treatment tending to dextrinization.—Helen U. Kiely, Paul deC. Bray, Frank D. Libby, C. N. Candee, T. Linsey Crossley, Chairman.

# Imports of Paper and Paper Stock

## Giving Manifests of New York, Boston, Philadelphia and Other Ports, of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

### NEW YORK IMPORTS

WEEK ENDING JULY 31, 1937

SUMMARY

Cigarette paper .....884 cs.
Wall paper .....15 cs.
Paper hangings .....4 bls.
Newsprint .....18,229 rolls
Printing paper .....2 cs., 200 rolls
Wrapping paper .....49 cs., 359 rolls
Drawing paper .....3 cs.
Filter paper .....12 cs.
Filter compound .....50 cs.
Filter mass .....100 bls.
Surface coated paper .....125 cs.
Metal coated paper .....36 cs.
Photo paper .....28 cs.
Decalcomania paper..15 dr., 3 cs. (duplex), 14 cs. (simplex)
Decalcomanias .....6 cs.
Transparent paper .....2 cs.
Transfer paper .....42 cs.
Colored paper .....2 bls.
Gummed paper .....1 cs.
Imitation ivory boards .....40 rolls
Strawboards .....213 rolls
Paper tubes .....258 pkgs.
Miscellaneous paper .....194 bls., 50 rolls, 106 cs.

CIGARETTE PAPER

American Tobacco Co., *Schodack,* Bordeaux, 498 cs.
Champagne Paper Corp., *Schodack,* Bordeaux, 250 cs.
Champagne Paper Corp., *Ile de France,* Havre, 53 cs.
De Mauduit Paper Corp., *Ile de France,* Havre, 2 cs.
De Mauduit Paper Corp., *Pr. Roosevelt,* Havre, 11 cs.
R. J. Reynolds Tobacco Co., *Pr. Roosevelt,* 70 cs.

WALL PAPER

F. Blank Co., *Pr. Roosevelt,* Havre, 11 cs.
——, *Kamikawa Maru,* Yokohama, 3 cs.
——, *Hansa,* Bremen, 1 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., *American Farmer,* London, 4 bls.

NEWSPRINT

International Paper Co., *Oakbank,* Dalhousie, 5,169 rolls.
International Paper Sales Co., *Oakbank,* Dalhousie, 2,832 rolls.
——, *Bergensfjord,* Skien, 244 rolls.
——, *Bergensfjord,* Oslo, 209 rolls.
World Telegram, *Hopedene,* Three Rivers, Que., 5,554 rolls.
N. Y. Post, *Rena,* Port Alfred, Que., 2,184 rolls.
International Paper Co., *International No. 1,* Gatineau, 316 rolls.
Jay Madden Corp., *Pr. Roosevelt,* Hamburg, 171 rolls.
Perkins Goodwin & Co., *Hansa,* Hamburg, 487 rolls.
Jay Madden Corp., *Hansa,* Bremen, 177 rolls.
Walker Goulard Plehn Co. Inc., *Scanmail,* Kotka, 83 bls.
Lunham & Reeve, Inc., *Scanmail,* Kotka, 176 rolls.
Jay Madden Corp., *Scanmail,* Kotka, 627 rolls.

PRINTING PAPER

Lafayette Co., *Laconia,* Liverpool, 2 cs.
Parsons & Whittemore, Inc., *Pr. Roosevelt,* Hamburg, 200 rolls.

WRAPPING PAPER

Yardley Co., *American Farmer,* London, 6 cs.
Jay Madden Corp., *Pr. Roosevelt,* Hamburg, 359 rolls.
E. Dietzgen & Co., *Hansa,* Hamburg, 41 cs.
Phoenix Shipping Co., *Hansa,* Hamburg, 2 cs.

DRAWING PAPER

H. Reeve Angel & Co. Inc., *American Farmer,* London, 3 cs.

FILTER PAPER

H. Reeve Angel & Co. Inc., *American Farmer,* London, 12 cs.

FILTER COMPOUND

H. Reifenberg, *Hansa,* Hamburg, 50 cs.

FILTER MASS

Schlock Gusmer Co., *Hansa,* Bremen, 100 bls.

SURFACE COATED PAPER

Gevaert Co. of America, *Black Falcon,* Antwerp, 67 cs.
Globe Shipping Co., *Hansa,* Hamburg, 38 cs.
L. A. Consmiller, *Hansa,* Bremen, 20 cs.

METAL COATED PAPER

K. Pauli Co., *Hansa,* Bremen, 36 cs.

PHOTO PAPER

American Express Co., *Hansa,* Hamburg, 28 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Laconia,* Liverpool, 15 dr., 3 cs. (Duplex).
B. F. Drakenfeld & Co., *Laconia,* Liverpool, 14 cs. (Simplex)

DECALCOMANIAS

Sellers Transportation Co., *Hansa,* Hamburg, 6 cs.

TRANSPARENT PAPER

——, *Kamikawa Maru,* Yokohama, 2 cs.

TRANSFER PAPER

J. H. & G. B. Siebold, Inc., *Hansa,* Hamburg, 42 cs.

COLORED PAPER

W. H. S. Lloyd & Co., *Black Falcon,* Antwerp, 2 bls.

GUMMED PAPER

Meadows Wye & Co., *American Farmer,* London, 1 cs.

IMITATION IVORY BOARDS

R. Wilson Paper Corp., *Volendam,* Rotterdam, 40 rolls.

STRAWBOARDS

——, *Volendam,* Rotterdam, 213 rolls.

PAPER TUBES

——, *Hansa,* Bremen, 258 pkgs.

PAPER

B. F. Drakenfeld & Co., *Laconia,* Liverpool, 5 cs.
——, *Hokkai Maru,* Kobe, 6 cs.
Japan Paper Co., *Pr. Wilson,* Kobe, 15 cs.
Metropolitan Importing & Manfg. Co., *Pr. Roosevelt,* Hamburg, 21 cs .
Keuffel & Esser Co., *Hansa,* Hamburg, 59 cs., 50 rolls.
——, *Hansa,* Hamburg, 194 bls.

RAGS, BAGGINGS, ETC.

A. A. Silverton Co. Inc., *Kalinin,* Leningrad, 34 bls. rags.
Banco Coml. Italiane Trust Co., *Kalinin,* Leningrad, 572 bls. rags.
Chase National Bank, *Kalinin,* Leningrad, 1,302 bls. rags.
——, *American Importer,* Manchester, 20 bls. bagging.
——, *American Importer,* Belfast, 10 bls. flax waste.
M. Snedeker Corp., *American Importer,* Belfast, 85 bls. paper stock.
——, *Laconia,* Liverpool, 21 bls. rags.
Castle & Overton, Inc., *Black Osprey,* Rotterdam, 110 bls. bagging.
D. Benedetto, Inc., *Black Osprey,* Rotterdam, 56 bls. rags.
F. J. Fawcett, *Black Falcon,* Antwerp, 8 bls. flax waste.
Loumar Textile By Products, *Black Falcon,* Antwerp, 100 bls. jute waste.
American Express Co., *Black Falcon,* Antwerp, 308 bls. rags.

———, *American Farmer,* London, 77 bls. rags.
Chase National Bank, *American Farmer,* London, 748 bls. flax waste.
E. J. Keller Co. Inc., *Pr. Garfield,* ———, 139 bls. rags.
Hicks Costarino Co., *Pr. Garfield,* Bombay, 162 bls. rags.
———, *Liberty,* Leith, 40 bls. bagging.
Castle & Overton, Inc., *Liberty,* Dundee, 65 bls. paper stock.
J. Cohen & Son Co. Inc., *Liberty,* Dundee, 8 bls. paper stock.
———, *Liberty,* Dundee, 153 bls. paper stock.
Michigan Felt Co., *Kamikawa Maru,* Shanghai, 200 bls. picker waste.
Globe Sanitary Products Corp., *Kamikawa Maru,* Kobe, 41 bls. rags.
E. J. Keller Co. Inc., *Exiria,* ———, 262 bls. rags.

HIDE CUTTINGS

American Express Co., *American Importer,* Liverpool, 640 bags.

OLD ROPE

D. Benedetto, Inc., *Volendam,* Rotterdam, 29 coils.
Banco Coml. Italiane Trust Co., *American Farmer,* London, 116 coils.
E. J. Keller Co. Inc., *Pr. Wilson,* ——— 36 coils.

WOOD PULP

Perkins Goodwin & Co., *Bergensfjord,* Drammen, 750 bls. sulphite.
The Borregaard Co. Inc., *Bergensfjord,* Olso, 504 bls. sulphite.
Chase National Bank, *Bergensfjord,* Oslo, 750 bls. sulphite.
Irving Trust Co., *Bergensfjord,* Oslo, 1,700 bls. chemical pulp.
Bulkley Dunton Pulp Co. Inc., *Kersten Miles,* ———, 4,850 bls. sulphite, 915 tons.
Bulkley Dunton Pulp Co. Inc., *Kersten Miles,* ———, 3,450 bls. sulphate, 650 tons.
Bulkley Dunton Pulp Co. Inc., *Kersten Miles,* ———, 4,000 bls. chemical pulp, 600 tons.
———, Kersten Miles, *Hernosand,* 4,950 bls. sulphite, 788 tons.
———, *Kersten Miles,* Hernosand, 1,743 bls. sulphate, 290 tons.
———, *Kersten Miles,* Hernosand, 3,660 bls. sulphate, 610 tons.
Johaneson Wales & Sparre, Inc., *Kersten Miles,* Obbola, 2,345 bls. sulphate, 335 tons.
Johaneson Wales & Sparre, Inc., *Kersten Miles,* Munksund, 200 bls. sulphate, 26 tons.
Johaneson Wales & Sparre, Inc., *Kersten Miles,* Sundsvall, 4,975 bls. sulphite.
Johaneson Wales & Sparre, Inc., *Kersten Miles,* Sundsvall, 150 bls. kraft sulphate, 25 tons.
Johaneson Wales & Sparre, Inc., *Kersten Miles,* Sundsvall, 120 bls. knotter pulp, 20 tons.
Johaneson Wales & Sparre, Inc., *Kersten Miles,* Sundsvall, 200 bls. chemical pulp, 40 tons.
Mead Sales Co. Inc., *Kersten Miles,* Sundsvall, 210 bls. chemical pulp, 42 tons.
Mead Sales Co. Inc., *Kersten Miles,* Sundsvall, 315 bls. sulphite, 63 tons.
Stora Kopparberg Corp., *Innaren,* Skutskar, 2,015 bls. dry pulp.
Pagel Horton & Co. Inc., *Innaren,* Skutskar, 625 bls. sulphite.
Pagel Horton & Co. Inc., *Innaren,* Skutskar, 1,295 bls. sulphate.
Price & Pierce, Ltd., *Innaren,* Ljusne, 1,302 bls. unbleached sulphite.
Price & Pierce, Ltd., *Innaren,* Ljusne, 150 bls. unbleached kraft pulp.
Bulkley Dunton Pulp Co. Inc., *Innaren,* ———, 800 bls. sulphite.
Perkins Goodwin & Co., *Innaren,* Sundsvall, 450 bls. sulphite.
Perkins Goodwin & Co., *Innaren,* Sundsvall, 600 bls. sulphate.
Gottesman & Co. Inc., *Innaren,* Sundsvall, 3,000 bls. sulphite.
Johaneson Wales & Sparre, Inc., *Innaren,* Sundsvall, 625 bls. sulphite.
Lagerloef Trading Co., *Scanmail,* Wiborg, 630 bls. sulphate.
Lagerloef Trading Co., *Scanmail,* Wiborg, 813 bls. sulphite, 155 tons.
Lagerloef Trading Co., *Scanmail,* Kotka, 780 bls. mechanical, 156 tons.
Lagerloef Trading Co., *Scanmail,* Kotka, 250 bls. sulphate, 50 tons.
Lagerloef Trading Co., *Scanpenn,* Helsingfors, 3,330 bls. sulphite, 573 tons.
Lagerloef Trading Co., *Scanpenn,* Wiborg, 1,016 bls. mechanical, 203 tons.
Lagerloef Trading Co., *Scanpenn,* Kotka, 296 bls. sulphite, 50 tons.
M. Sone, *Pr. Roosevelt,* Hamburg, 1,300 bls. wood pulp, 261 tons.
———, *Hansa,* Hamburg, 725 bls. wood pulp, 104 tons.

WOOD PULP BOARDS

Jay Madden Corp., *Scanmail,* Kotka, 519 bls., 231 rolls.
Jay Madden Corp., *Scanmail,* Wiborg, 50 bls.

## NEWARK IMPORTS

WEEK ENDING JULY 31, 1937

H. G. Craig Co., *Donpaco,* Donnacona, 320 rolls newsprint.
H. G. Craig Co., *Kermic,* Donnacona, 326 rolls, 16 pkgs. newsprint.
H. G. Craig Co., *A. C. D.,* Donnacona, 270 rolls newsprint.

## ALBANY IMPORTS

WEEK ENDING JULY 31, 1937

Perkins Goodwin & Co., *Kersten Miles,* Soderhamn, 450 bls. sulphate, 90 tons.
———, *Kersten Miles,* Hernosand, 3,000 bls. sulphate, 500 tons.
Perkins Goodwin & Co., *Kersten Miles,* Munksund, 3,000 bls. kraft sulphate, 500 tons.
Johaneson Wales & Sparre, Inc., *Kersten Miles,* Obbola, 175 bls. sulphate, 25 tons.
Johaneson Wales & Sparre, Inc., *Kersten Miles,* Sundsvall, 3,330 bls. sulphite, 630 tons.
Johaneson Wales & Sparre, Inc., *Kersten Miles,* Sundsvall, 1,000 bls. chemical pulp, 200 tons.
Bulkley Dunton Pulp Co. Inc., *Kersten Miles,* ———, 1,000 bls. sulphite, 200 tons.
Halifax Power & Pulp Co., *Marga,* Sheet Harbor, N. S., 2,142 tons wood pulp.

## BOSTON IMPORTS

WEEK ENDING JULY 31, 1937

Stone & Downer Co., *Black Falcon,* Antwerp, 118 rolls wrapping paper.
Meredith Linen Mills, *Black Falcon,* Antwerp, 76 bls. flax waste.
Royal Manufacturing Co., *Black Falcon,* Antwerp, 27 bls. cotton waste.
Royal Manufacturing Co., *Black Falcon,* Antwerp, 5 bls. wrapping paper.
———, *Black Falcon,* Antwerp, 30 bls. cotton waste, 13 bls. rags.
Price & Pierce, Ltd., *Minnequa,* ———, 150 bls. unbleached sulphite.

## NEW LONDON IMPORTS

WEEK ENDING JULY 31, 1937

Johaneson Wales & Sparre, Inc., *Kersten Miles,* Sundsvall, 1,900 bls. sulphite, 375 tons.
Bulkley Dunton Pulp Co. Inc., *Kersten Miles,* ———, 1,000 bls. sulphite, 200 tons.

## PHILADELPHIA IMPORTS

WEEK ENDING JULY 31, 1937

Castle & Overton, Inc., *Schodack,* St. Nazaire, 57 bls. rags.
———, *Clara,* Sebenik, 4,800 bls. sulphite.
E. J. Keller Co. Inc., *Black Osprey,* ———, 199 bls. rags.
Castle & Overton, Inc., *Black Osprey,* Rotterdam, 94 bls. rags.
———, *Liberty,* Hamburg, 382 rolls wrapping paper.
———, *Liberty,* Hamburg, 66 bls. rags.
J. Walworth & Son, Inc., *Liberty,* Dundee, 27 bls. paper stock.
———, *Scanmail,* Copenhagen, 25 rolls paper.
J. W. Hampton Jr. Co., *Scanmail,* Kotka, 422 rolls newsprint.
Jay Madden Corp., *Scanmail,* Kotka, 167 bls., 47 rolls wood pulp boards.
Jay Madden Corp., *Scanmail,* Kotka, 348 rolls newsprint.
Lagerloef Trading Co., *Scanmail,* Kotka, 252 bls. sulphite, 50 tons.
Castle & Overton, Inc., *Scanmail,* Wiborg, 1,300 bls. wood pulp, 260 tons.
Lagerloef Trading Co., *Scanmail,* Wiborg, 1,680 bls. sulphite, 320 tons.
Jay Madden Corp., *Scanmail,* Wiborg, 60 bls. wood pulp boards.

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Chrysoidine Y is a popular Basic Orange. It is extensively used in coloring kraft, tissue, boxboard, poster, news and catalog papers. It has little affinity for the bleached pulps and its use should be confined to the unbleached fibres. It is the base for the conventional container board shade.

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Sarpsborg, Norway
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## New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, August 4, 1937.

The wholesale paper market continues normal for the season, sales of fair volume taking place. The call for newsprint is sustained.

Bonds, ledgers, book papers and cover papers, as well as tissues are in moderate demand. Wrapping paper is fairly active, with values well maintained, although the market is somewhat spotty. Box board continues to display activity, with a little improvement. Dealers are anticipating at least a somewhat brisker market within two weeks. Specialties are moving in fair quantities.

### Chemical Pulp

The condition remains the same as formerly, with the market unchanged. European grades continue to command high prices.

### Mechanical Pulp

Trading continues slow. Prices are firm. The mills abroad still maintain the same high prices.

### Old Rope and Bagging

Little change has occurred in the old rope market. The demand for both domestic and foreign manila is slightly greater. Trading in scrap and gunny bagging is much firmer. Prices are unchanged.

### Rags

The domestic market is quiet, although the demand for old whites continues to be more substantial than the rag market in general. An improved condition characterizes the market for roofing grades. Prices are steady.

### Waste Paper

The better grades are selling more actively, while the board grades are in even better demand. Prices are firm, although the increased demand is bringing about an advancing trend.

### Twine

Business in twines is transacted in fair volume. Sisal, jutes, hemps and javas are selling in moderate quantities, with values firm. Cotton twines in both the polished and unpolished grades were generally weak for the period under review, but stabilization is looked for soon.

## Metzgar Co. Offers New Line

The Metgzar Company, Grand Rapids, Mich., has had so many calls for its End-Wood Truck and Trailer Wheel which is made up for sheave purposes, that the company is now offering this to the trade either keyed to shafts or fitted with its Oilless End-Wood Bearings, Ball Bearings, or Hyatt Bearings.

## Philadelphia Paper Men Play Golf

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., August 5, 1937—At the recent outing of the Paper and Cordage Association, held at Pine Valley Country Club, Clementon, N. J., thirty-five members and their guests teed off. This course is conceded to be one of the hardest in this section but everyone was in fine fettle, and with smiling skies overhead the following participated: J. H. Bancroft, D. L. Ward Company, who had as his guests Dr. J. G. McDonald, Frank Chamber and Dr. M. L. Weimann of Tavistock Country Club, Haddonfield, N. J.; Charles A. Wilder and Joseph Dubinsky of Wilder Brothers, with their guests Martin Greenbaum, champion of Green Valley Country Club, Jack Stein and Max Milestone, also of Green Valley Country Club; Fred'k. I. Brower, Atlantic Gummed Papers; Stanleigh C. Brower of J. L. N. Smythe Company, whose guest was M. G. Foraker of Lee Tire and Rubber Company, Conshohocken, and J. R. Shaw of same company; J. L. Thomas of Whiting-Patterson Company; John R. Howarth with his brother George Howarth and Mrs. Doris E. Lewis, executive secretary of the Paper Trade Association of Philadelphia; E. L. Richards, Buffalo Envelope Company, and Mrs. Richards, C. A. Slater, accompanied by Mrs. Slater; G. S. Smith, president, Champion Container Corporation; W. S. Parker, Mannington Mills, Inc., Salem, N. J.; Max Dee of Dee Paper Company; Leonard A. Peck, Paper House of Pennsylvania, who had as his guest R. W. Shaffer of Cincinnati, Ohio, and J. R. Harlen, S. H. Gloecker, both of Philadelphia; M. Stoner, A. Molley, Messers. Farnum, Shay and MacLoskey; J. W. Hoskins, V. Rader and G. Weber, Premier Vacuum Company; George Hoffner of Simon Walter, Inc. Mr. Hoffner carried off both prizes for low net and low gross.

President E. K. Lay accompanied by former president George K. Hooper, Sam Shyrock of Shyrock Brothers, and Harry S. Platt of Denney Tag Company, joined the golfers at 6 o'clock dinner, which was served al fresco on the spacious veranda of the clubhouse.

## Edsall Paper Co. To Start Mill

The property known as the Hollingsworth Paper Mill in Phoenix, N. Y., was sold to the Edsall Paper Corporation of New York City through Gibbs-Brower & Co., paper mill brokers. The contract for remodeling the old machinery as well as installing new equipment was given to C. R. Burkhardt, paper mill engineer, of 39 Cortland Street, New York City. It is the intention of the corporation to start manufacturing September 1.

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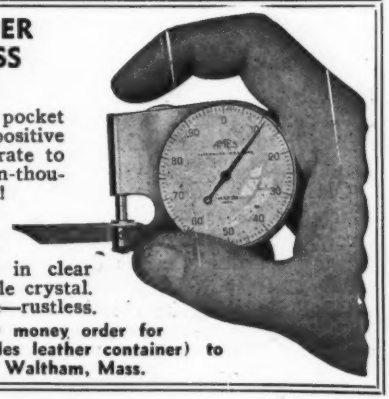
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FREDERICK, MARYLAND

# Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, August 4, 1937.

BLANC FIXE—Trading is normal for the season. Generally, prices conform with formerly quoted levels. Pulp is offered at from $42.50 to $45 per ton, in bulk, while the powder is being offered at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—In accordance with the usual condition displayed at this time of the year, trading in the bleaching powder market is very active. The contract movement is normal. Prices are generally maintained at previously quoted levels. Bleaching powder is offered at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The casein market remains firm. Domestic standard ground casein is selling at from 13 to 14 cents per pound, while domestic finely ground casein is quoted at from 13½ to 14½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA—Trading in the caustic soda market is quite satisfactory. The contract movement is average. Solid caustic soda is quoted at from $14.50 to $25 per ton, ship side, while domestic paper making clay is selling at from $6.50 to $12 per ton, at works.

CHINA CLAY—The condition of the china clay market appears quite favorable. Contract shipments are moving freely. Imported china clay is quoted at from $14.50 to $25 per ton, ship side, while domestic paper making clay is selling at from $6.50 to $12 per ton, at works.

CHLORINE—The chlorine market is normal for the season. The contract movement complies with the norm. Prices are generally maintained at previously quoted levels. Chlorine is selling in single-unit tank cars at $2.15 per 100 pounds, f.o.b., at works.

ROSIN—The condition of the rosin market has changed slightly. Paper making rosin is now quoted at $7.80 and wood rosin at $7.90 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at $3.59 per 100 pounds, in tank cars, at works.

SALT CAKE—Trading in the salt cake market is steady. Salt cake is quoted at from $12 to $13; chrome salt cake at from $10 to $11, f.o.b., shipping point, while imported salt cake is selling at $12, Gulf or Atlantic Seaboard, on dock.

SODA ASH—The soda ash market is fairly active. Demand from the paper mills is quite insistent. Prices are well maintained. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—Demand for starch remains substantial and the contract movement is regular. Prices are firm. Special paper making starch is now quoted at $4 per 100 pounds, in bags; and at $4.27 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA—The sulphate of alumina market continues as active as formerly. Contract shipments are moving very well. Prices are unchanged. Commercial grades are quoted at from $1.25 to $1.60; while iron free is selling at from $2 to $2.25 per 100 pounds, in barrels, at works.

SULPHUR—The condition of the sulphur market is unchanged. Yearly contracts are quoted at $18 per long ton on orders of 1,000 tons or over. On spot and nearby car loads the quotations are $21 per ton. All quotations are in car lots, at works.

TALC—Activity in the talc market continues in an upward direction. In general, prices are maintained at previously mentioned levels. Domestic talc is quoted at from $15 to $18 per ton, at eastern mines, while imported talc is selling at from $23 to $30 per ton, on dock.

# Market Quotations

## Paper

**Tissues—Per Ream—**

| | | | |
|---|---|---|---|
| White No. 1 | 1.10 | @ | — |
| White No. 1 M. G. | 1.07½ | @ | — |
| White No. 1½ | .77½ | @ | — |
| White No. 2 | .75 | @ | — |
| Anti-Tarnish M. G. | .77½ | @ | — |
| Colored | .90 | @ | — |
| Kraft | .77½ | @ | — |
| Manila | .75 | @ | — |
| Unbleached Toilet | 2.60 | @ | 3.30 |
| Bleached Toilet | 3.94 | @ | 5.26 |

**Paper Towels—**

| | | | |
|---|---|---|---|
| Unbleached | 2.10 | @ | 3.35 |
| Bleached | 3.30 | @ | 3.70 |

**Manila—**

| | | | |
|---|---|---|---|
| No. 1 Jute | 9.00 | @ | 9.25 |
| No. 2 Jute | 7.75 | @ | 8.50 |
| No. 1 Wood | 4.00 | @ | 5.25 |
| No. 2 Wood | 3.50 | @ | 4.00 |

**Fibre Papers—**

| | | | |
|---|---|---|---|
| No. 1 Fibre | 4.25 | @ | 5.50 |
| No. 2 Fibre | 4.00 | @ | 4.75 |

(Delivered New York)

**News, per ton—**

| | | | |
|---|---|---|---|
| Roll, contract | 42.50 | @ | — |
| Sheets | 47.50 | @ | — |

**Kraft—**

| | | | |
|---|---|---|---|
| No. 1 Northern | 5.25 | @ | 5.75 |
| Standard | 5.00 | @ | — |
| Southern | 5.00 | @ | — |
| Glazed | 4.50 | @ | — |
| Striped | 4.75 | @ | — |

**Boards, per ton—**

| | | | |
|---|---|---|---|
| News | 47.50 | @ | — |
| Chip | 45.00 | @ | — |
| Sgl. Mla. Li. Chip | 55.00 | @ | — |
| Jute Lined Chip | 55.00 | @ | — |
| Kraft Liners | 65.00 | @ | — |
| White Pat. Coated | 67.50 | @ | — |
| Binders Boards | 75.00 | @ | 80.00 |

The following are representative of distributors' resale prices:—

**Rag Content Bonds and Ledgers—**
White, Assorted Items,
Delivered in Zone 1:

| | Bonds | Ledgers |
|---|---|---|
| 100% Rag Ext. No. 1 | $41.40@$48.50 | $42.55@$50.00 |
| 100% Rag | 32.80@ 38.50 | 33.95@ 39.75 |
| 85% Rag | ..... | 32.20@ 37.75 |
| 75% Rag | 24.75@ 29.00 | 25.90@ 30.50 |
| 65% Rag | 21.65@ 26.25 | 22.80@ 27.75 |
| 50% Rag | 18.70@ 22.75 | 19.90@ 24.25 |
| 25% Rag | 15.80@ 19.25 | 16.95@ 20.75 |

Regular Colors @ $1.50 cwt. extra.
Heavy Colors @ $3.00 cwt. extra

**Sulphite Bonds and Ledgers—**
White, Assorted Items,
Delivered in Zone 1:

| | Bonds | Ledgers |
|---|---|---|
| No. 1 | $9.35@$11.50 | $10.55@$12.75 |
| No. 2 | 8.50@ 10.25 | 9.65@ 11.75 |
| No. 4 | 7.60@ 9.25 | 8.80@ 10.75 |

Regular Colors @ $1.50 cwt. extra.
Heavy Colors @ $3.00 cwt. extra.

**Free Sheet Book Papers—**
White, Cased Paper,
Delivered in Zone 1:

| | | | |
|---|---|---|---|
| No. 1 Glossy Coated | $12.45 | @ | $14.25 |
| No. 2 Glossy Coated | 10.80 | @ | 12.25 |
| No. 3 Glossy Coated | 9.65 | @ | 11.00 |
| No. 4 Glossy Coated | 9.05 | @ | 10.50 |
| No. 1 Antique (watermarked) | 9.05 | @ | 10.50 |
| No. 2 Offset | 8.35 | @ | 9.50 |
| A Grade E. F. | 8.20 | @ | 9.50 |
| A Grade S. & S. C. | 8.45 | @ | 9.75 |
| B Grade E. F. | 7.60 | @ | 8.75 |
| B Grade S. & S. C. | 7.85 | @ | 9.00 |
| C Grade E. F. | 7.30 | @ | 8.50 |
| C Grade S. & S. C. | 7.55 | @ | 8.75 |
| D Grade E. F. | 7.00 | @ | 8.25 |
| D Grade S. & S. C. | 7.25 | @ | 8.50 |

Ivory & India at $.50 cwt. extra.

## Mechanical Pulp

(On Dock, Atlantic Ports)

| | | | |
|---|---|---|---|
| No. 1 Imported— | | | |
| Moist | 35.00 | @ | 36.00 |
| Dry | 40.00 | @ | 42.00 |

(Delivered)

| | | | |
|---|---|---|---|
| No. 1 Domestic and Canadian | 36.00 | @ | 37.50 |

## Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

| | | | |
|---|---|---|---|
| Bleached Sulphite (Domestic and Foreign)— | | | |
| Prime Bleached Sulphite | 3.25 | @ | 4.65 |
| Prime Qualities— | | | |
| Easy-Bleaching Sulphite | 3.50 | @ | 4.00 |
| Strong Unbleached Sulphite | 3.25 | @ | 3.65 |

(On Dock, Atlantic Ports)

| | | | |
|---|---|---|---|
| Kraft Bleached | 4.00 | @ | 4.75 |
| Kraft Light & Strong | 3.00 | @ | 3.75 |
| Kraft No. 1 | 2.90 | @ | 3.65 |
| Kraft No. 2 | 2.50 | @ | 2.75 |

(F.o.b. Pulp Mill)

| | | | |
|---|---|---|---|
| Kraft Domestic | 2.75 | @ | 3.25 |

(Delivered)

| | | | |
|---|---|---|---|
| Soda Bleached | 3.15 | @ | — |

Add 60 cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

## Domestic Rags

**New Rags**

(Prices to Mill f. o. b. N. Y.)

| | | | |
|---|---|---|---|
| Shirt Cuttings— | | | |
| New White, No. 1 | 9.00 | @ | 9.25 |
| Silesias, No. 1 | 6.75 | @ | 7.00 |
| New Unbleached | 9.25 | @ | 9.50 |
| Blue Overall | 7.25 | @ | 7.50 |
| Fancy | 3.75 | @ | 4.25 |
| Washables | 2.75 | @ | 3.25 |
| Mixed Khaki Cuttings | 4.25 | @ | 4.50 |
| O. D. Khaki Cuttings | 4.75 | @ | 5.00 |

**Old Rags**

| | | | |
|---|---|---|---|
| White, No. 1— | | | |
| Repacked | 3.75 | @ | 4.25 |
| Miscellaneous | 3.00 | @ | 3.25 |
| White, No. 2— | | | |
| Repacked | 2.60 | @ | 2.85 |
| Miscellaneous | 2.00 | @ | 2.25 |
| Thirds and Blues— | | | |
| Repacked | 2.00 | @ | 2.25 |
| Miscellaneous | 1.90 | @ | 2.00 |
| Roofing Rags— | | | |
| No. 1 | Nominal | | |
| No. 2 | 1.15 | @ | 1.25 |
| No. 3 (bagging) | .90 | @ | 1.00 |
| No. 4 | .90 | @ | 1.00 |
| No. 5A | .75 | @ | .85 |

## Foreign Rags

**New Rags**

| | |
|---|---|
| New Dark Cuttings | Nominal |
| New Mixed Cuttings | Nominal |
| New Light Silesias | Nominal |
| Light Flannelettes | Nominal |
| New White Cuttings | Nominal |
| New Light Oxfords | Nominal |
| New Light Prints | Nominal |

**Old Rags**

| | |
|---|---|
| No. 1 White Linens | Nominal |
| No. 2 White Linens | Nominal |
| No. 3 White Linens | Nominal |